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THE ENGLISH LANGUAGE
UNDER ONE ALPHABET

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(Formerly Editor-in-Chief of the International Cyclopedia)

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SCHEME OF SOUND SYMBOLS

FOR THE PRONUNCIATION OF WORDS.

Note.—(-) is the mark dividing words respelt phonetically into syllables; (′), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

Sound-symbols employed in Respelling.	Representing the Sounds as exemplified in the Words.	Words respelt with Sound-symbols and Marks for Pronunciation.
ā	mate, fate, fail, aye	*māt, fāt, fāl, ā.*
ă	mat, fat	*măt, făt.*
â	far, calm, father	*fâr, kâm, fâ'th̄ėr.*
ä	care, fair	*cär, fär*
aw	fall, laud, law	*fawl, lawd, law.*
ē	mete, meat, feet, free	*mēt, mēt, fēt, frē.*
ĕ	met, bed	*mĕt, bĕd.*
ė	her, stir, heard, cur	*hėr, stėr, hėrd, kėr.*
ī	pine, ply, height	*pīn, plī, hīt.*
ĭ	pin, nymph, ability	*pĭn, nĭmf, ă-bĭl'ĭ-tĭ.*
ō	note, toll, soul	*nōt, tōl, sōl.*
ŏ	not, plot	*nŏt, plŏt.*
ô	move, smooth	*môv, smôth̄.*
ö	Goethe (similar to *e* in her)	*gö'tėh.*
ow	noun, bough, cow	*nown, bow, kow.*
oy	boy, boil	*boy, boyl.*
ū	pure, dew, few	*pūr, dū, fū.*
ŭ	bud, come, tough	*bŭd, kŭm, tŭf.*
û	full, push, good	*fûl, pûsh, gûd.*
ü	French plume, Scotch guid	*plüm, güd.*
ch	chair, match	*chär, măch.*
ċh	German buch, Heidelberg, Scotch loch (guttural)	*bôċh, hī'dêl-bĕrċh, lŏċh.*
g	game, go, gun	*gām, gō, gŭn.*
j	judge, gem, gin	*jŭj, jĕm, jĭn.*
k	king, cat, cot, cut	*kĭng, kăt, kŏt, kŭt.*
s	sit, scene, cell, city, cypress	*sĭt, sēn, sĕl, sĭt'ĭ, sī'prĕs.*
sh	shun, ambition	*shŭn, ăm-bĭsh'ŭn.*
th	thing, breath	*thĭng, brĕth.*
th̄	though, breathe	*th̄ō, brēth̄.*
z	zeal, maze, muse	*zēl, māz, mūz.*
zh	azure, vision	*ăzh'ėr, vĭzh'ŭn.*

ABBREVIATIONS USED IN THIS WORK.

a., *or* adj	adjective
A.B	Bachelor of Arts
abbr	abbreviation, abbreviated
abl. *or* abla.	ablative
Abp	Archbishop
abt	about
Acad	Academy
acc. *or* ac.	accusative
accom	accommodated, accommodation
act	active
A.D.	in the year of our Lord [*Anno Domini*]
Adjt	Adjutant
Adm	Admiral
adv. *or* ad.	adverb
A. F	Anglo-French
Ag	Silver [*Argentum*]
agri	agriculture
A. L.	Anglo-Latin
Al	Aluminium
Ala	Alabama
Alb	Albanian
alg	algebra
A.M.	before noon [*ante meridiem*]
A.M.	Master of Arts
Am	Amos
Amer	America, -n
anat	anatomy, anatomical
anc	ancient, anciently
AN. M.	in the year of the world [*Anno Mundi*
anon	anonymous
antiq	antiquity, antiquities
aor	aorist, -ic
app	appendix
appar	apparently
Apr	April
Ar	Arabic
arch	architecture
archæol	archæology
arith	arithmetic
Ariz	Arizona
Ark	Arkansas
art	article
artil	artillery
AS.	Anglo-Saxon
As	Arsenic
Assoc	Association
asst	assistant
astrol	astrology
astron	astronomy
attrib	attributive
atty	attorney
at. wt	atomic weight
Au	Gold [*Aurum*]
A.U.C.	in the year of the building of the city (Rome) [*Annourbis conditæ*]
Aug	August
aug	augmentative
Aust	Austrian
A. V.	authorized version [of Bible, 1611]
avoir	avoirdupois
B	Boron
B.	Britannic
b	born
Ba	Barium
Bart	Baronet
Bav	Bavarian
bl.; bbl.	barrel; barrels
B.C.	before Christ
B.C.L.	Bachelor of Civil Law
B.D.	Bachelor of Divinity
bef	before
Belg	Belgic
Beng	Bengali
Bi	Bismuth
biog	biography, biographical
biol	biology
B.L.	Bachelor of Laws
Bohem	Bohemian
bot	botany, botanical
Bp	Bishop
Br	Bromine
Braz	Brazilian
Bret	Breton
Brig	Brigadier
Brit	British, Britannica
bro	brother
Bulg	Bulgarian
bush	bushel, bushels
C	Carbon
c	century
Ca	Calcium
Cal	California
Camb	Cambridge
Can	Canada
Cant	Canterbury
cap	capital
Capt	Captain
Card	Cardinal
carp	carpentry
Cath	Catholic
caus	causative
cav	cavalry
Cd	Cadmium
Ce	Cerium
Celt	Celtic
cent	central
cf	compare [*confer*]
ch *or* chh.	church

ABBREVIATIONS.

Chal	Chaldee
chap	chapter
chem	chemistry, chemical
Chin	Chinese
Chron	Chronicles
chron	chronology
Cl	Chlorine
Class	Classical [= Greek and Latin]
Co	Cobalt
Co	Company
co	county
cog	cognate [with]
Col	Colonel
Col	Colossians
Coll	College
colloq	colloquial
Colo	Colorado
Com	Commodore
com	commerce, commercial
com	common
comp	compare
comp	composition, compound
compar	comparative
conch	conchology
cong	congress
Congl	Congregational
conj	conjunction
Conn *or* Ct.	Connecticut
contr	contraction, contracted
Cop	Coptic
Cor	Corinthians
Corn	Cornish
corr	corresponding
Cr	Chromium
crystal	crystallography
Cs	Cæsium
ct	cent
Ct. *or* Conn.	Connecticut
Cu	Copper [*Cuprum*]
cwt	a hundred weight
Cyc	Cyclopedia
D	Didymium
D. *or* Dut.	Dutch
d	died
d. [l. s. d.]	penny, pence
Dan	Daniel
Dan	Danish
dat	dative
dau	daughter
D. C.	District of Columbia
D.C.L.	Doctor of Civil [or Common] Law
D.D.	Doctor of Divinity
Dec	December
dec	declension
def	definite, definition
deg	degree, degrees
Del	Delaware
del	delegate, delegates
dem	democratic
dep	deputy
dep	deponent
dept	department
deriv	derivation, derivative
Deut	Deuteronomy
dial	dialect, dialectal
diam	diameter
Dic	Dictionary

diff	different, difference
dim	diminutive
dist	district
distrib	distributive
div	division
doz	dozen
Dr	Doctor
dr	dram, drams
dram	dramatic
Dut. *or* D.	Dutch
dwt	pennyweight
dynam *or* dyn	dynamics
E	Erbium
E. *or* e	East, -ern, -ward
E. *or* Eng.	English
Eccl	Ecclesiastes
eccl. *or* eccles	ecclesiastical [affairs]
ed	edited, edition, editor
e.g	for example [*ex gratia*]
E. Ind. *or* E. I.	East Indies, East Indian
elect	electricity
Emp	Emperor
Encyc	Encyclopedia
Eng. *or* E.	English
engin	engineering
entom	entomology
env. ext	envoy extraordinary
ep	epistle
Eph	Ephesians
Episc	Episcopal
eq. *or* =	equal, equals
equiv	equivalent
esp	especially
Est	Esther
estab	established
Esthon	Esthonian
etc	and others like [*et cetera*]
Eth	Ethiopic
ethnog	ethnography
ethnol	ethnology
et seq	and the following [*et sequentia*]
etym	etymology
Eur	European
Ex	Exodus
exclam	exclamation
Ezek	Ezekiel
Ezr	Ezra
F	Fluorine
F. *or* Fahr.	Fahrenheit
f. *or* fem	feminine
F. *or* Fr	French
fa	father
Fahr. *or* F.	Fahrenheit
far	farriery
Fe	Iron [*Ferrum*]
Feb	February
fem *or* f.	feminine
fig	figure, figuratively
Fin	Finnish
F.—L.	French from Latin
Fla	Florida
Flem	Flemish
for	foreign
fort	fortification
Fr. *or* F.	French
fr	from

ABBREVIATIONS.

freq	frequentative
Fris	Frisian
ft	foot, feet
fut	future
G. *or* Ger	German
G	Glucinium
Ga	Gallium
Ga	Georgia
Gael	Gaelic
Gal	Galatians
gal	gallon
galv	galvanism, galvanic
gard	gardening
gen	gender
Gen	General
Gen	Genesis
gen	genitive
Geno	Genoese
geog	geography
geol	geology
geom	geometry
Ger	German, Germany
Goth	Gothic
Gov	Governor
govt	government
Gr	Grand, Great
Gr	Greek
gr	grain, grains
gram	grammar
Gr. Brit	Great Britain
Gris	Grisons
gun	gunnery
H	Hegira
H	Hydrogen
h	hour, hours
Hab	Habakkuk
Hag	Haggai
H. B. M.	His [or Her] Britannic Majesty
Heb	Hebrew, Hebrews
her	heraldry
herpet	herpetology
Hg	Mercury [*Hydrargyrum*]
hhd	hogshead, hogsheads
Hind	Hindustani, Hindu, or Hindi
hist	history, historical
Hon	Honorable
hort	horticulture
Hos	Hosea
Hung	Hungarian
Hydros	Hydrostatics
I	Iodine
I.; Is	Island ; Islands
Icel	Icelandic
ichth	ichthyology
Ida	Idaho
i.e.	that is [*id est*]
Ill	Illinois
illus	illustration
impera *or* impr	imperative
impers	impersonal
impf *or* imp	imperfect
impf. p. *or* imp	imperfect participle
improp	improperly
In	Indium
in	inch, inches
incept	inceptive
Ind	India, Indian
Ind	Indiana
ind	indicative
indef	indefinite
Indo-Eur	Indo-European
inf	infantry
inf *or* infin	infinitive
instr	instrument, -al
int	interest
intens	intensive
interj. *or* int	interjection
interrog	interrogative pronoun
intr. *or* intrans	intransitive
Io	Iowa
Ir	Iridium
Ir	Irish
Iran	Iranian
irr	irregular, -ly
Is	Isaiah
It	Italian
Jan	January
Jap	Japanese
Jas	James
Jer	Jeremiah
Jn	John
Josh	Joshua
Jr	Junior
Judg	Judges
K	Potassium [*Kalium*]
K	Kings [in Bible]
K	king
Kan	Kansas
Kt	Knight
Ky	Kentucky
L	Latin
L	Lithium
l. [l. s. d.], *or* £	pound, pounds [sterling]
La	Lanthanium
La	Louisiana
Lam	Lamentations
Lang	Languedoc
lang	language
Lap	Lapland
lat	latitude
lb.; llb. *or* lbs	pound ; pounds [weight]
Let	Lettish
Lev	Leviticus
LG	Low German
L.H.D	Doctor of Polite Literature
Lieut	Lieutenant
Lim	Limousin
Lin	Linnæus, Linnæan
lit	literal,-ly
lit	literature
Lith	Lithuanian
lithog	lithograph, -y
LL	Late Latin, Low Latin
LL.D	Doctor of Laws
long	longitude
Luth	Lutheran
M	Middle
M	Monsieur
m	mile, miles
m. *or* masc	masculine
M.A	Master of Arts
Macc	Maccabees
mach	machinery
Mag	Magazine

ABBREVIATIONS.

Maj	Major
Mal	Malachi
Mal	Malay, Malayan
manuf	manufacturing, manufacturers
Mar	March
masc *or* m	masculine
Mass	Massachusetts
math	mathematics, mathematical
Matt	Matthew
M.D.	Doctor of Medicine
MD	Middle Dutch
Md	Maryland
ME	Middle English, or Old English
Me	Maine
mech	mechanics, mechanical
med	medicine, medical
mem	member
mensur	mensuration
Messrs. *or* MM	Gentlemen, Sirs
metal	metallurgy
metaph	metaphysics, metaphysical
meteor	meteorology
Meth	Methodist
Mex	Mexican
Mg	Magnesium
M.Gr	Middle Greek
MHG	Middle High German
Mic	Micah
Mich	Michigan
mid	middle [voice]
Milan	Milanese
mid. L. *or* ML.	Middle Latin, Mediæval Latin
milit. *or* mil	military [affairs]
min	minute, minutes
mineral	mineralogy
Minn	Minnesota
Min. Plen	Minister Plenipotentiary
Miss	Mississippi
ML. *or* mid. L.	Middle Latin, Mediæval Latin
MLG	Middle Low German.
Mlle	Mademoiselle
Mme	Madam
Mn	Manganese
Mo	Missouri
Mo	Molybdenum
mod	modern
Mont	Montana
Mr	Master [Mister]
Mrs	Mistress [Missis]
MS.; MSS	manuscript; manuscripts
Mt	Mount, mountain
mus	music
MUS. DOC	Doctor of Music
myth	mythology, mythological
N	Nitrogen
N. *or* n	North, -ern, -ward
n	noun
n *or* neut	neuter
Na	Sodium [*Natrium*]
Nah	Nahum
N. A., *or* N. Amer	North America, -n
nat	natural
naut	nautical
nav	navigation, naval affairs
Nb	Niobium
N. C. *or* N. Car	North Carolina
N. D	North Dakota
Neb	Nebraska
neg	negative
Neh	Nehemiah
N. Eng	New England
neut *or* n	neuter
Nev	Nevada
N.Gr	New Greek, Modern Greek
N. H	New Hampshire
NHG	New High German [German]
Ni	Nickel
N. J	New Jersey
NL	New Latin, Modern Latin
N. Mex	New Mexico
N. T., *or* N. Test	New Testament
N. Y	New York [State]
nom	nominative
Norm. F	Norman French
North. E	Northern English
Norw	Norwegian, Norse
Nov	November
Num	Numbers
numis	numismatics
O	Ohio
O	Old
O	Oxygen
Obad	Obadiah
obj	objective
obs. *or* †	obsolete
obsoles	obsolescent
O.Bulg	Old Bulgarian or Old Slavic
Oct	October
Odontog	odontography
OE	Old English
OF *or* O. Fr	Old French
OHG	Old High German
Ont	Ontario
opt	optics, optical
Or	Oregon
ord	order
ord	ordnance
org	organic
orig	original, -ly
ornith	ornithology
Os	Osmium
OS.	Old Saxon
O. T., *or* O. Test	Old Testament
Oxf	Oxford
oz	ounce, ounces
P	Phosphorus
p.; pp	page; pages
p., *or* part	participle
Pa. *or* Penn	Pennsylvania
paint	painting
palæon	palæontology
parl	parliament
pass	passive

ABBREVIATIONS.

pathol *or* path	pathology
Pb	Lead [*Plumbum*]
Pd	Palladium
Penn *or* Pa.	Pennsylvania
perf	perfect
perh	perhaps
Pers	Persian, Persic
pers	person
persp	perspective
pert	pertaining [to]
Pet	Peter
Pg. *or* Port	Portuguese
phar	pharmacy
PH.D	Doctor of Philosophy
Phen	Phenician
Phil	Philippians
Philem	Philemon
philol	philology, philological
philos. *or* phil	philosophy, philosophical
phonog	phonography
photog	photography
phren	phrenology
phys	physics, physical
physiol	physiology, physiological
Pied	Piedmontese
Pl	Plate
pl. *or* plu	plural
Pl. D	Platt Deutsch
plupf	pluperfect
P.M	afternoon [*post meridiem*]
pneum	pneumatics
P. O	Post-office
poet	poetical
Pol	Polish
pol econ	political economy
polit	politics, political
pop	population
Port. *or* Pg.	Portuguese
poss	possessive
pp	pages
pp	past participle, perfect participle
p. pr	present participle
Pr. *or* Prov.	Provençal
pref	prefix
prep	preposition
Pres	President
pres	present
Presb	Presbyterian
pret	preterit
prim	primitive
priv	privative
prob	probably, probable
Prof	Professor
pron	pronoun
pron	pronunciation, pronounced
prop	properly
pros	prosody
Prot	Protestant
Prov. *or* Pr.	Provençal
Prov	Proverbs
prov	province, provincial
Prov. Eng.	Provincial English
Prus	Prussia, -n
Ps	Psalm, Psalms
psychol	psychology
pt	past tense
pt	pint
Pt	Platinum
pub	published, publisher, publication
pwt	pennyweight
Q	Quebec
qt	quart
qtr	quarter [weight]
qu	query
q.v.	which see [*quod vide*]
R	Rhodium
R	River
Rb	Rubidium
R. Cath	Roman Catholic
rec. sec	recording secretary
Ref	Reformed
refl	reflex
reg	regular, -ly
regt	regiment
rel. pro. *or* rel	relative pronoun
repr	representing
repub	republican
Rev	Revelation
Rev	The Reverend
Rev. V	Revised Version
rhet	rhetoric, -al
R. I	Rhode Island
R. N	Royal Navy
Rom	Roman, Romans
Rom	Romanic or Romance
Rom. Cath. Ch. *or* R. C. Ch.	Roman Catholic Church
r.r	railroad
Rt. Rev	Right Reverend
Ru	Ruthenium
Russ	Russian
r.w	railway
S	Saxon
S	Sulphur
s	second, seconds
s. [l. s. d.]	shilling, shillings
S. *or* s	South, -ern, -ward
S. A. *or* S. Amer.	South America, -n
Sam	Samaritan
Sam	Samuel
Sans, *or* Skr	Sanskrit
Sb	Antimony [*Stibium*]
s.c	understand, supply, namely [*scilicet*]
S. C. *or* S. Car.	South Carolina
Scand	Scandinavian
Scot	Scotland, Scotch
scr	scruple, scruples
Scrip	Scripture [s], Scriptural
sculp	sculpture
S. D	South Dakota
Se	Selenium
sec	secretary
sec	section
Sem	Semitic
Sep	September
Serv	Servian
Shaks	Shakespeare
Si	Silicon

ABBREVIATIONS.

Sic	Sicilian
sing	singular
sis	sister
Skr. *or* Sans	Sanskirt
Slav	Slavonic, Slavic
Sn	Tin [*Stannum*]
Soc	Society
Song Sol	Song of Solomon
Sp	Spanish
sp. gr	specific gravity
sq	square
Sr	Senior
Sr	Strontium
St.: Ste.	Saint
St.	street
stat	statute
S.T.D	Doctor of Sacred Theology
subj	subjunctive
suf	suffix
Su. Goth	Suo-Gothic
superl	superlative
Supp	Supplement
Supt	Superintendent
surg	surgery, surgical
Surv	surveying
Sw	Swedish
Swab	Swabian
sym	symbol
syn	synonym, -y
Syr	Syriac, Syrian
t	town
Ta	Tantalum
Tart	Tartar
Te	Tellurium
technol	technology
teleg	telegraphy
Tenn	Tennessee
term	termination
terr	territory
Teut	Teutonic
Tex	Texas
Th	Thorium
theat	theatrical
theol	theology, theological
therap	therapeutics
Thess	Thessalonians
Ti	Titanium
Tim	Timothy
Tit	Titus
Tl	Thallium
toxicol	toxicology
tp	township
tr. *or* trans	transitive
transl	translation, translated
trigon	trigonometry
Turk	Turkish
typog	typography, typographical
U	Uranium
ult	ultimate, -ly
Unit	Unitarian
Univ	Universalist
Univ	University
U. Presb	United Presbyterian
U. S.	United States
U. S. A.	United States Army
U. S. N.	United States Navy
Ut	Utah
V	Vanadium
v	verb
Va	Virginia
var	variant [word]
var	variety of [species]
Ven	Venerable
Venet	Venetian
vet	veterinary
v. i. *or* v. intr	verb intransitive
vil	village
viz	namely, to-wit [*videlicet*]
v. n	verb neuter
voc	vocative
vol	volume
vols	volunteers
Vt	Vermont
v. tr	verb transitive
W	Tungsten [*Wolfram*]
W	Welsh
W. *or* w	West, -ern, -ward
Wal	Walachian
Wall	Walloon
Wash	Washington
Westph	Westphalia, -n
W. Ind. *or* W. I.	West Indies, West Indian
Wis	Wisconsin
wt	weight
W. Va	West Virginia
Wyo	Wyoming
Y	Yttrium
yd	yard
yr	year
Zech	Zechariah
Zeph	Zephaniah
Zn	Zinc
zool	zoology, zoological
Zr	Zirconium

See also ABBREVIATIONS: in Vol. I.

IMPERIAL ENCYCLOPEDIA AND DICTIONARY.

PETROL′OGY [Gr. science of rocks]: term recently introduced into geology to designate particular aspects of the study of rocks, apart from their organic contents. By some, it is confined to an examination of their structure and composition; by others, it is extended to the study of rock-masses, their planes of division, their forms, their position and mutual relations, and other characters not bearing on the question of the geological time of their production. Also spelled PETRALOGY.

PETROMY′ZON: see LAMPREY.

PETRONEL, n. *pĕt′rō-nĕl* [OF. *petrinal*, a horseman's piece—from Sp. *petrina*, a girdle, a belt, the weapon being stuck in the girdle: F. *poitrine;* L. *pectus*, the breast]: in *OE.*, a clumsy pistol or small gun used by a horseman.

PETRONIUS, *pē-trō′nĭ-ŭs*, C. (PETRO′NIUS AR′BITER): d. B.C. 66: Roman voluptuary at the court of Nero, whose profligacy is said to have been most superb and exquisite. We know, however, very little about him. He was at one time proconsul of Bithynia, was subsequently appointed consul, and is certified as having performed his official duties with energy and prudence. But his grand ambition was to shine as a court-exquisite. He was a kind of Roman *Beau Brummel*, and Nero thought as highly of him as did the Prince Regent of the famous Beau. He was intrusted by his imperial master and companion with the charge of the royal entertainments, and thus obtained (according to Tacitus) the title of *Arbiter Elegantiæ.* Nero would not venture to pronounce anything *comme il faut* until it had received the approval of the oracle of Roman fashion. The influence which he thus acquired was the cause of his ruin. Tigellinus, another favorite of Nero, conceived a hatred of P., brought false accusations against him, and succeeded in getting his whole household arrested. P. saw that his destruction was inevitable, and committed suicide, but in a languid and graceful style, such, he thought, as became his life. He opened some veins, but every now and then applied bandages to them, and thus stopped the flow of blood, so that he was for a while enabled to gossip gayly with his friends, and even to appear in the streets of Cumæ before he died. We are told that he wrote, sealed, and dispatched to Nero, a few hours before his death, a paper containing an account of the tyrant's crimes and flagitious deeds. It has been generally supposed that P. is the author of a well-known work entitled, in the oldest MSS., *Petronii Arbitri Satyricon*, a series of fragments belonging apparently to a very extensive comic novel or romance (see NOVELS), the greater portion of which has perished; but there is really no satisfactory evidence either to prove or to disprove his authorship. It is probable, however, that the work belongs to the 1st c. after Christ. The fragments exhibit a horrible picture of the depravity of the times; but there is no indication that the author disapproves of what he describes. The *editio princeps* of the fragments appeared at Venice 1499; later editions are those of Burmann (Traj. ad. Rhen. 1709; 2d ed. Amst. 1743) and of Bücheler (3d ed. Berl. 1882).

PETROPAVLOVSK, *pā-trō-pâv-lŏvsk′:* town of Asiatic Russia, province of Akmollinsk, on the river Ishim, 175 m. w.n.w. of Omsk. It is an important military station, and has a large trade. Pop. (1880) 11,400.—P. is the name also of a small port on the e. coast of Kamtchatka, formerly of importance to Russia: pop. about 17,000.

PETROPOLIS, *pē-trŏp′ō-lĭs*, Port. *pā-tro-po-lēs′:* town in the state of Rio de Janeiro, Brazil; about 25 m. n. from the city of Rio de Janeiro with which it is connected by railroad. Founded for the benefit of poor German immigrants, it has become a prosperous town; has a fine park and several creditable public buildings. The late emperor of Brazil had a palace here, and, on account of its beautiful and elevated situation, it is a favorite resort in summer. There is a large cotton-mill near the town.—Pop. about 10,000.

PETROSAL, n. *pĕt-rōz′ăl* [L. *petrōsŭs*, full of rocks—from *petra*, a rock]: the dense and solid mass of bone forming a part of the temporal bone and entering into the base of the skull; the ear-capsule bone in a fish.

PETROSILEX, n. *pĕt′rō-sī′lĕks* [L. *petra*, rock; *silex*, flint]: rock-flint or hornstone. PET′ROSILI′CEOUS, a. *-sĭ-lĭsh′ŭs*, consisting of or containing petrosilex.

PETROUS, a. *pĕt′rŭs* [L. *petrōsus*, full of rocks—from *petra*, a stone]: hard; stony; in *anat.*, applied to a dense, solid mass of bone, forming a part of the temporal bone, in which the organs of hearing are situated; designating a ganglion situated in the lower border of the petrous portion of the temporal bone. PETROSAL, a. *pĕt-rōz′ăl*, in same sense as 'petrous.' PETROSAL NERVE, a branch of the vidian nerve.

PETROVSK, *pā-trŏvsk′:* town of Russia, province of Saratov, 55 m. n.w. of Saratov; on the Medvieditza, tributary of the Don. Pop. (1890) 16,385.

PETROZAVODSK, *pā-trō-zâ-vŏdsk′:* important mining-town in n. European Russia, cap. of the govt. of Olonetz, on the w. shore of Lake Onega, 300 m. by water n.e. of St. Petersburg. A cannon-foundry was erected here 1701 by Peter the Great, who had discovered the rich resources of this northern region in iron and copper ores. The town itself dates from 1703; and from that to the present time, it has been the great centre of the mining industry of the government. The Alexandrovsky arms-factory is specially noticeable. It was founded 1773, and, besides other arms, it has produced many thousand pieces of cast-iron ordnance. There are works also for preparation of steel. Wood abounds in the vicinity, and there is easy communication by water with St. Petersburg. Pop. (1890) 10,920.

PETSH, *pĕch*, or Ipek, *ē-pāk′* (i.e., silk): town of European Turkey, in Albania; on the Bistritza, or White Drin, 70 m. n.e. of Scutari. It is a pleasant town; the houses are large and handsome, and usually have gardens attached in which fruit and mulberry-trees are cultivated. Water, from the river, is led up into all the houses. Silk is extensively made, tobacco and fruits are largely cultivated, and arms manufactured. P. was formerly the residence of the Servian patriarchs. Pop. more than 16,000.

PETTICOAT, n. *pĕt′tĭ-kōt* [F. *petit*, little, petty, and Eng. *coat*]: a loose under-garment worn by females. Petticoat government, female rule; dominion or influence of a woman.

PETTIFOGGER, n. *pĕt′tĭ-fŏg′gėr* [F. *petit*, little, mean, and OE. *fog*, to resort to mean expedients: Ger. *fug*, convenience, opportunity: comp. Gael. *fogair*, chase, hunt: O. Dut. *focker*, an engrosser of wares and commodities: the word has also been derived from F. *voguer*, to row]: a lawyer who is employed in small or mean business. Pet′tifog′ging, a. conducting inferior or mean law business; playing the part of a pettifogger. Pet′tifog′gery, a. *-gėr-ĭ*, the practice or the acts of a pettifogger; tricks; quibbles: see Fog 2.

PETTILY, PETTINESS: see under Petty.

PETTINGILL, *pĕt′in-gĭl*, John Hancock: theological writer: 1815, May 11—1887, Feb. 27; b. Manchester, Vt. He graduated at Yale 1837, and at Union Theol. Seminary; was teacher in the deaf and dumb institution, New York; Congl. pastor at S. Dennis, Mass., Westbrook, Conn., and Saxonville, Mass.; dist.sec. of the Amer. Board of For. Missions 1852–60, living at Albany, N. Y.; visited Turkish missions 1856–7; and was chaplain of Amer. Seamen's Friend Soc. at Antwerp 1866–7, where he received govt. commendation for services to cholera patients. Returning, he published *Homiletical Index* (1877), and advocated the 'annihilation' doctrine (immortality dependent on Christian faith and discipleship) in *Theol. Trilemma* (1878); *Platonism versus Christianity*, and *Bible Terminology* (1881); *Life Everlasting*

(1882); *The Unspeakable Gift* (1884); *Views and Reviews in Eschatology* (1887). His books had wide circulation, and made many converts in this country and abroad, where they were translated into several languages.

PETTISH, PETTISHLY, PETTISHNESS: see under PET 1.

PETTIT, *pĕt′ĭt*, CHARLES: 1736–1806, Sep. 4; b. N. J. He was commissioned surrogate 1767, two years later became provincial deputy-sec., and began law practice 1770. He was the governor's sec. 1772–74 and 1776–78, a member of the council 1773, and asst. quartermaster-gen. 1778 till the close of the revolution. When peace was restored, he became a merchant in Philadelphia; was a member of the Penn. legislature 1783–4 and of congress 1785–87. He was a member of the Harrisburg convention, and strongly favored the adoption of the federal constitution; devised the funding system adopted by the state of Penn., was a member of the American Philosophical Soc., was for many years a trustee of the Univ. of Pennsylvania, and for seven years previous to his death was pres. of a prominent insurance company. He died at Philadelphia.

PETTITOES, n. plu. *pĕt′tĭ-tōz* [Norm. F. *petots*, little feet]: the toes or feet of a pig; *sportively*, applied to the human feet.

PETTO, n. *pĕt′tō* [It. *petto*, the breast—from L. *pectus*, the breast]: the breast. IN PETTO, in secrecy; in reserve—a phrase applied to the pope, who is accustomed to make appointments *in secret*.

PETTY, a. *pĕt′tĭ* [F. *petit*, little, small: comp. It. *piccolo:* Sp. *pequeno*, small: W. *pitw*, little, small: W. *pid*, a point]: small in amount; inferior; little; inconsiderable; trivial. PET′TILY, ad. *-tĭ-lĭ*. PET′TINESS, n. *-nĕs*, smallness; littleness; unimportance. PETTY CASH, money kept in hand to meet current expenses. PETTY-CASH BOOK, a book for entering small receipts and payments. PETTY JURY, in the United States, usually PETIT JURY, as distinguished from GRAND JURY, a jury of 12 men to try ordinary or small cases in a court. PETTY BAG OFFICE, in Britain, office of the court of chancery, abolished 1874, and its miscellaneous duties transferred mostly to officials of the supreme court—so named from the writs being kept in a little sack. PETTY SESSIONS, court constituted by two or more justices of the peace, sitting in administration of their ordinary jurisdiction: see JUSTICE OF THE PEACE.—SYN. of 'petty': trivial; unimportant; frivolous; little; diminutive; inconsiderable; trifling; inferior; small.

PETTY, *pĕt′tĭ*, Sir WILLIAM: 1623, May 16—1687, Dec. 16; b. Romsey, Hampshire, England. After attending school near home, he studied in France, and became an officer in the English navy, but resigned in order to study medicine in Paris. He practiced his profession at Oxford, secured a college fellowship 1648, and two years later was elected prof. of anatomy at the Univ. of Oxford. In 1651 he was called to the chair of medicine in Gresham College, and the next year was appointed physician to the army in Ireland. He rendered distinguished service in surveying large tracts of forfeited land in Ireland, and was sec. to the lord lieut. of that country; became a member of parliament 1658, was made surveyor-gen. of Ireland, and was knighted 1661. He made numerous discoveries and inventions, among the latter a pentagraph for copying drawings. He engaged in various speculations which made him wealthy. He was one of the first of the great writers on political economy, and has been called the principal English founder of the science. He wrote extensively also on politics, education, and finance. He died at Westminster.

PET′TY OF′FICERS, in the Navy: upper class of seamen, analogous to non-commissioned officers in the army. They comprise the men responsible for proper care of the several portions of the ship, the foremen of artificers, the signalmen, and many others. A ship's efficiency is greatly dependent on this useful class of sailors. They are divided into three classes: chief P. O.; first-class working P. O.; and second-class working P. O. They are appointed and can be degraded by the captain of the ship.

PETULANT, a. *pĕt′ū-lănt* [F. *pétulant*—from L. *pet′ulans*, *petulan′tem*, pert, saucy—perhaps from *peto*, I attack or assail: It. *petulante*]: irritable or pert from fretfulness or ill-humor; saucy; capriciously peevish; freakish in passion. PET′ULANTLY, ad. *-lĭ*. PET′ULANCE, n. *-lăns* [F.—L.], or PET′ULANCY, n. *-lăn-sĭ*, peevishness; saucy pertness.—SYN. of 'petulant': fretful; cross; peevish; irritable; captious; cavilling; ill-humored; pert.

PETUNIA, n. plu. *pĕ-tū′nĭ-ă* [Brazilian *petun*, tobacco —so named from its affinity with *Nicotiana*]: genus of plants of nat. order *Solanaceæ*, natives of warmer parts of America; herbaceous plants, very nearly allied to Tobacco, and with some similarity to it in general appearance of the foliage, which has also a slight viscidity, and emits when handled a disagreeable smell. The flowers are very beautiful, especially in closely planted beds; and varieties improved by cultivation are among favorite ornaments of greenhouses and flower-borders. The petunias, though perennial, are very often treated as annuals, sown on a hot-bed in spring, and planted out in summer, in which way they thrive even in northern countries. They are tall plants, with branching weak stems, and may readily be made to cover a trellis. Although, when treated as greenhouse plants, they become half-shrubby, they do not live more than two or three years.

PETUNSE, n., or Petuntse, or Petuntze, n. *pĕ-tŭns′:* fine white clay used by the Chinese with kaolin in their manufacture of porcelain: it is said to consist of comminuted but undecomposed felspar. It is fusible, and is used for glazing porcelain.

PETWORTH MAR′BLE, *pĕt′wėrth*, or Sussex Mar′ble, *sŭs′ĕks* [named from its being found at Petworth, in Sussex, England]: thin layer of limestone, composed of the shells of fresh-water Paludinæ. It has been used long though not extensively for ornamental purposes. A polished slab of it was found in a Roman building at Chichester, England; and pillars formed of it stand in the cathedrals of Chichester and Canterbury.

PEUCE, n. *pūs*, or Peucites, n. plu. *pū′sīts* [Gr. *peukē*, the pine or fir]: generic name for all fossil wood which appears to have been cone-producing.

PEUTINGERIAN TA′BLE, *pū-tĭn-jĕ′rĭ-an:* interesting ancient document showing the military roads of the Roman empire, and indeed of the world known to the Romans. It is not, properly speaking, a map; no regard being paid to geographic position, or the extent of countries. The great lines of road are laid down in a narrow strip, as if nearly parallel, all proceeding from Rome as a centre; and as to rivers, it appears only whether they cross the road from left to right or from right to left of the traveller proceeding from Rome. The Mediterranean and other seas are represented by mere narrow channels. A small house is the mark for a town; important towns and military stations are distinguished by walls and towers. Rome, Constantinople, and Antioch are each represented by a circle, within which is a human figure seated; in the case of Rome, the figure is crowned. Until very recently, a portion of the only copy of this valuable relic of antiquity known to exist was evidently wanting, as it terminated abruptly on the w. at the confines of Spain, and included only the e. parts of Britain. In the e., it traces roads through India to a number of places of trade as far as the mouths of the Ganges. It is on parchment, and, as described in all the publications devoted to it, twenty-one ft. in length, and about 12 in. wide. It was found in the library of the Benedictine monastery at Tegernsee in Upper Bavaria, in the 15th c., by Conrad Celtes, who bequeathed it to Conrad Peutinger of Augsburg, a zealous antiquary, and one of the earliest authors on the Roman and other antiquities of Germany. Peutinger began to prepare a copy of it for publication, but died before he could accomplish his purpose, which, however, was partially executed by Mark Welser, in *Fragmenta Tabulæ Antiquæ ex Peutingerorium Bibliotheca* (Venice 1591). The anc. document itself remained in the hands of the Peutinger family, and attracted no further notice, till it was offered for sale 1714, and purchased by Prince Eugene, who presented it to the Imperial Library of Vienna, in which it remains. An exact copy was published at Vienna 1753, with introduction and index by F. C. von Scheyb. It was again published as an appendix to Katancsich's *Orbis Antiquus* (Ofen. 1825); and at the request of the Acad. of Munich, a revised ed., with introduction, was published by Conrad Mannert (Leip. 1824). Since that time, a leaf detached from the rest has been found in the Imperial Library at Vienna, but we are not aware that any particular account of it or its contents has yet been given to the public.

The P. T. does not always agree with the Antonine Itinerary (see ITINERARY); some stations and towns being marked in one which are not in the other, the distances marked also being sometimes different. But the two together throw great light on ancient geography. It appears almost certain from internal evidence that the P. T. belongs to the 3d or beginning of the 4th c. of the Christian era, though the existing copy seems to belong to a later date. The general character of the work seems to refer its authorship to times of prevalent paganism; while a few things appear, probably alterations of a copyist, which refer to Christianity.

PEW, n. *pū* [anc. *pue;* OF. *pui*, an elevated place—from L. *podĭŭm*, an elevated place, a balcony: Dut. *puyde* or *puye*, a pulpit or reading-desk: OE. *pues:* It. *poggia:* Sp. *poys*—anc., in general, 'anything on which to lean,' *s'appuyer*]: inclosed seat in a church or chapel: V. to fit or furnish with pews. PEW′ING, imp. PEWED, pp. *pūd.* PEW-OPENER, attendant in a church who opens the pew-doors for the seat-holders.—*Pews* in the sense of fixed church-seats were in use in England some time before the Reformation, as is proved by numerous examples extant, the carving on some of which is as early as the Decorated Period, i.e., before 1400; and records as old as 1450 speak of such seats by the name of *pues.* They were originally plain fixed benches, all facing east, with partitions of wainscoting about three ft. high, and sides of the width of the seat, panelled or carved; the sides sometimes rising above the wainscoting, and ending in finials or poppies, or else ranging with it and finished with a molding. After the Reformation—probably under the influence of the Puritans, who, objecting to some parts of the service which they were by law compelled to attend, sought means to conceal their nonconformity—pews grew into large and high inclosures, containing two or four seats, lined with baize, and fitted with doors, desks, and cushions. Pews were early assigned to particular owners, but at first only to the patrons of churches. A canon made at Exeter, 1287, rebukes quarrelling for a seat in church, and decrees that none shall claim a seat as his own except noblemen and the patrons. Gradually, however, the system of appropriation was extended to other inhabitants of the parish, to the injury of the poor, and the multiplication of disputes.

The law of pews in England is briefly this: All church-seats are at the disposal of the bishop, and may be assigned by him, either (1) directly by faculty to the holders of any property in the parish; or (2) through the church-wardens, whose duty it is, as officers under the bishop, to 'seat the parishioners according to their degree.' In the former case, the right descends with the property, if the faculty can be shown, or immemorial occupation be proved. In the latter, the right can at any time be recalled, and it lapses on the party ceasing to be a regular occupant of the seat. It appears that by common law every parishioner has a right to a seat in the church, and the church-wardens are bound to place each one as best they can. The practice of *letting* pews, except under the church-building acts, or special local acts of parliament, and, much more, the practice of *selling* them, has been declared illegal.

In Scotland, pews in the parish churches are assigned by the Heritors (q.v.) to the parishioners, who have accordingly the preferable claim on them; in towns the practice is to let them annually. As is well known, pews in dissenting churches are rented as a means of revenue to sustain general charges. In many parts of the United States, pews in churches are rented by annual competition, and bring very large sums: in many churches a different system prevails—that of private ownership. Latterly in the United States and in England, there has been discussion as to the injuriously exclusive character of the 'pew system;' and a disposition has been manifested in the United States to abolish the selling or renting of pews, and to declare them all free—raising funds for support of the church either by an endowment, or by annual voluntary contribution. In England, some have proposed to abolish pews altogether, and substitute movable seats available by all. In the Rom. Cath. churches on the European continent, pews are very rare.

PEWEE, or **Peewee**, *pē′wē*, or **Phœbe**, *fē′bē;* sometimes **Pewit**, or **Peewit**, *pē′wit*, or **Puit**, *pū′it:* names imitative of the notes of certain birds; and very confusedly applied. Pewee ends in vowels and is appropriate to the Wood Pewee (*Contopus virens*), with its soft prolongation of its second note. There is a Western Wood Pewee (var. ***Richardsonii***), smaller, darker; Rocky Mts. to the Pacific. Peewit is more befitting the Phœbe-bird (*Sayiornis fusca*), with its shorter termination of note; it is unhappily sometimes called Water Pewee, when it nests on river-banks or under bridges. Others of this genus are Say's Pewit Fly-catcher, western (*S. sayi*), and the Black Pewit Fly-catcher (*S. nigricans*) of western rocky streams and cañons. The genus Contopus, among other differences, has the tarsus shorter than the middle toe and claw; Sayiornis not so. Both belong to the numerous groups of fly-catchers, and under the family Tyrannidæ. Unfortunately, the name peewit (also puit, puet) has been given to birds very unlike the fly-catchers, such as the peewit-gull or laughing-gull of Europe; also the lapwing, which is also called peweep, peaseweep, and piewipe.

PEWIT, n. *pē′wĭt*, or Pe′wet: see Peewit.

PEWTER, n. *pū′tėr* [OF. *peutre;* Dut. *peauter;* It. *peltro*, pewter; Sp. *peltre*]: common and very useful alloy of the metals tin and lead. Two other kinds of pewter have a more compound character. Common, or *ley-pewter*, consists of 4 parts of tin and 1 part of lead; *plate-pewter* is made of 100 parts of tin, 8 parts of antimony, 2 parts each of bismuth and copper; another kind, called *trifle*, is composed of 83 parts of tin and 17 parts of antimony. Although these are the standard formulas, each kind is often varied to suit the purposes of the manufacturer; the chief alteration being the addition of a large proportion of lead to the last, and a large increase of the same metal in the other two. Pew′tery, a. *-tėr-ĭ*, pertaining to pewter. Pew′terer, n. *-tėr-ėr*, one who works in pewter. Pewter-pot, a publican's measure for serving malt-liquors. *Note.*—Probably Eng. *spelter* is the original of *pewter;* and the It. *peltro* and others have been adopted from Eng. *spelter* by the loss of the initial *s*. *Zinc* or *spelter* and *pewter* are frequently confounded. See Skeat.

PEYER'S GLANDS, *pī′ėrz glăndz:* small glands beneath the villous coat of the intestines; they are most numerous in the lower portion of the ileum. When clustered together they are called *agmina*, or *insulæ*, *Peyeri;* when they occur singly they are called *glandulæ Peyeri solitariæ.* They take their distinctive appellation from the name of Johann Konrad Peyer (1653–1712) of Schaffhausen, who discovered and described them.

PÉZÉNAS, *pā-zā-nâ′:* manufacturing town of France, dept. of Herault, on the left bank of the river Herault, 25 m. w.s.w. of Montpellier. It stands in a district remarkable for its beauty, and so well cultivated as to have received the name of the Garden of Herault. It is famous for its healthful climate and clear sky. The vicinity produces excellent wine, and woolen and linen goods are manufactured: the trade, however, is chiefly in liquors, and P. is known as one of the principal brandy-markets of Europe. Pop. 8,000.

PFAHLBAUTEN, n. *fâl-bow′tĕn* [Ger., meaning literally pile-dwellings—from *pfahl*, a stake or post; *bau*, a structure or edifice]: a term applied by the Swiss to the prehistoric lake-habitations of that country.

PFEFFERS, *pfĕf′fėrss:* extraordinary and much-visited locality in the canton of St. Gall, Switzerland, five m. s.e. of Sargans. It has been famous since the middle of the 11th c. for its hot baths, 2,180 ft. above sea-level, 520 ft. above the village of Ragatz. The old baths of P. are built on a ledge of rock a few ft. above the roaring torrent of the Tamina, and are hemmed in by walls of rock towering 600 ft., and so far burying the baths within the gorge, that, even in the height of summer, sunlight appears above them only from 10 A.M. to 4 P.M. Above the old baths, the walls of the ravine of the Tamina contract until they meet, covering up the river, which is there seen from a cavernous gap. The hot springs are reached from the baths by means of a railed platform. This platform, leading to the hot spring, is secured to the rocks, and the Tamina churns its way through the cleft 30 or 40 ft. below. The waters of the hot spring are now conveyed to Ragatz (about two m. below P.) by wooden pipes, 12,500 ft. long. The waters, as they issue from the spring, have a temperature of 100° F. A pint of the water, which is used both for drinking and bathing, contains only about three grains of saline particles. Pop. (1880) 1,628.

PFEIFFER, *pfīf'fėr*, IDA (REYER): notable traveller over 150,000 m. of sea and 20,000 m. of land: 1797, Oct. 14 —1858, Oct. 27; b. Vienna. From her earliest years she showed a resolute and fearless, though not unfeminine, disposition. In 1820 she married an advocate, named Pfeiffer, from whom she was obliged to obtain a separation, after she had borne him two sons, Oscar and Alfred, whose education devolved on herself. When she had settled them in life, and was free to act as she pleased, she proceeded to gratify, at the age of 45, her long-cherished inclination for a life of travel and adventure. Her first expedition was to the Holy Land. She left Vienna 1842, Mar., and returned in Dec., having traversed, alone and without guide, European and Asiatic Turkey, Palestine, and Egypt. She published an account of her eastern rambles in the following year (*Reise einer Wienerin in das Heilige Land*), which, like all her other works, has gone through many editions, and been translated into French and English. In 1845 she visited n. Europe—Sweden, Norway, Lapland, and Iceland—and recorded her impressions in *Reise nach dem Skandinavischen, Norden und der Insel Island* (2 vols. 1846). But these journeys, which would have satisfied most women, were but little excursions in the eyes of this insatiable nomade, and only served to whet her appetite for something vaster. She resolved on a voyage round the world; and 1846, June 28, sailed from Hamburg in a Danish brig for Brazil. Her descriptions of the scenery of that country and of the inhabitants—both native Indians and Brazilians—are exceedingly interesting. She then sailed round Cape Horn to Chili; thence, after some time, across the Pacific to Otaheite, China, and Calcutta; crossed the Indian peninsula to Bombay, whence she took ship for the Persian Gulf, landed at Bassora, traversed a great part of w. Asia, s. Russia, and Greece, and re-entered Vienna 1848, Nov. 4. Two years later, she published a narrative of her travels and adventures, *Eine Frauenfahrt um die Welt* (Vienna 1850, 3 vols.). As a small recognition of her services, and of the singular energy, fortitude, and perseverance of her character, the Austrian govt. granted Madame P. a sum of $500. She now determined to go round the world again, but by a different route. Proceeding to England, she took ship 1851, May, for Sarawak, rounding the Cape of Good Hope, penetrated alone to the heart of Borneo, visited

Java and Sumatra, lived for a time with some cannibal tribes, and sailed from the Moluccas to California, thence to Peru, scaled the peaks of Chimborazo and Cotopaxi, made a tour through the principal of the United States, and returned to London 1854. This second voyage, signalized by several scientific observations, is described in *Meine zweite Weltreise* (Vien. 1856). But the more she travelled, the fiercer became her hunger for movement. 1856, Sep., she set out on what was to be her last expedition—namely, to Madagascar. After enduring terrible hardships, she came home to Vienna, where soon afterward she died.

PFORZHEIM, *pfōrts'hīm:* important manufacturing town of the grand-duchy of Baden, on the n. border of the Black Forest; on the Enz, at its confluence with the Nagold and Wurm, 55 m. s.s.e. of Mannheim, on a recently constructed branch of the Mannheim and Basel railway. Its trade has been greatly advanced by its position at the intersection of several minor lines of railway. P. contains the remains of an ancient castle, formerly the residence of the Markgrafs of Baden-Durlach; several churches, one of which, the *Schlosskirche*, on a height, contains a number of monuments, with marble statues of the princes of Baden; a convent for noble ladies; industrial and other schools; chemical and iron works; machine-shops, tanneries, and cloth and other factories. The principal articles of manufacture are gold and silver wares and trinkets, the chief markets for which are Germany and America. An important trade is carried on in timber, cut in the neighboring forests, and floated to Holland by the Neckar and Rhine. Pop. (1880) 24,037; (1890) 29,987; (1900) 43,351.

PHACOID, a. *făk'oyd* [Gr. *phakos*, a pea or lentil; *eidos*, appearance]: like a lentil.

PHACOPS, n. *făk'ŏps* [Gr. *phakos*, a lentil; *ōps*, the eye]: in *geol.*, a widely distributed genus of trilobites having large, faceted eyes.

PHÆDO, *fē'dō*, or PHÆDON, *fē'don:* philosopher: born in Greece, B.C. 4th c. While a youth he was captured by pirates and sold into slavery. He was brought to Athens, where he attracted the attention of Socrates, who procured his freedom and became his teacher. After the death of his instructor he founded the Eleatic system of philosophy. He was highly esteemed by Plato, who inscribed to him one of his celebrated dialogues.

PHÆDRA, *fē'drâ:* Greek legendary character, daughter of King Minos of Crete, and of Pasiphaë, and sister of Ariadne. She was wife of Theseus, and, according to the myth, became passionately in love with her step-son, Hippolytus, being inspired thereto by Venus, who was offended by his neglect of her worship. Being coldly received, P. made a false accusation against the young man to Theseus, who required of Neptune that he should be put to death. Accordingly Hippolytus was dragged behind his chariot on the sea-shore till he died. P., suffering from remorse, committed suicide, and the father then learned that the son that he had caused to be murdered had not been at fault. This legend has appeared in various forms. Sophocles and Euripides made it the foundation of famous tragedies, and Racine used it with great effect in his drama *Phédre.*

PHÆDRUS, *fē′drŭs:* Latin poet, whose works consist of fables; whose life was during the reigns of Augustus, Tiberius, Caligula, and Claudius; b. on the Pierian Mountain, Macedonia; carried to Rome as a slave in his childhood, and brought up at the court of Augustus, who emancipated him. Under Tiberius, he was exposed to great danger from the hostility of Sejanus, but lived to see that general's overthrow, and died at an advanced age, probably in the reign of Claudius. Five books of fables, after the manner of Æsop, and called *Fabulæ Æsopiæ*, have been usually ascribed to him. The faults of the style have led, however, to the suspicion, not merely of alterations at a later date, but of later, even much later, composition. The dry 'morals' have been supposed to indicate the Middle Ages as the period to which the work should probably be referred; but its authenticity is generally admitted. The first edition was published at Troyes 1596. The text has subsequently occupied the attention of some of the greatest scholars and critics, from the days of Burmann and Bentley to the present time. Early in the 18th c., a MS. containing 32 new fables of P. was discovered at Parma (pub. 1808,11); superseded by a much better preserved MS. of the same, discovered in the Vatican, and pub. by Card. Mai 1831. The authenticity of these was at first doubted: it is now generally conceded. As their place in the five vols. of P. is not known, they are printed usually as an appendix, but not counted as a 6th vol. There were critical editions of P. by Bentley, Orelli (1832), Dressler (1838), and Müller (1877).

PHÆNOGAMOUS, a. *fē-nŏg′ă-mŭs* [Gr. *phai′nō*, I show, I manifest; *gamos*, marriage]: in *bot.*, having conspicuous flowers: see PHANEROGAMIC (PHANEROGAMS).

PHÆOSPOREÆ, n. plu. *fē′ō-spō′rē-ē* [Gr. *phai′os*, dusky; *spora*, seed]: in *bot.*, a division of Melanosporeæ, or olive-colored sea-weeds, which possess zoospores.

PHAËTHON, *phā′ē-thŏn* [Gr. the shining one]: in the writings of Homer and Hesiod, a frequent title of Helios the sun-god, and subsequently employed as his name (see APOLLO).—P., in Greek mythology, is the name also of a son of Helios and the ocean-nymph Clymene; famous for his unfortunate attempt to drive his father's chariot. Scarcely had the presumptuous youth seized the reins, when the horses, perceiving his weakness, ran off, and, approaching too near the Earth, set on fire the mountains, dried up rivers and seas, scorched Libya to a desert, and blackened the Ethiopians with the heat. Whereupon the Earth cried to Jupiter for help, and Jupiter struck down P. with a thunderbolt into the Eridanus or Po. His sisters, the Heliades, who had harnessed the horses of the Sun, were changed into poplars on the river's banks, and their tears into amber.

PHAETON, n. *fā′ĕ-tŏn* [*Phaëthon* (q.v.) in *anc. myth.*]: open chaise or carriage on four wheels, having sometimes a small seat behind.

PHA′ETON: in *ornith.*, same as PHAËTHON (see TROPIC-BIRD).

PHAGEDÆNA, n. *făg′ĕ-dē nă* [Gr. *phagĕdai′na*, a cancer—from *phagein*, to eat]: spreading obstinate ulcer; gangrenous ulceration. PHAG′EDÆ′NIC, a. *-dē′nĭk*, rapidly destroying the parts attacked, as an ulcer.—PHAGEDÆNA designates a variety of ulceration in which there is much infiltration, with rapid destruction of the affected part. The sore presents an irregular outline and a yellowish surface; it gives off a profuse bloody or ichorish discharge, and is extremely painful. It usually attacks persons whose constitutions are vitiated by scrofula, by the syphilitic virus, by the abuse of mercury, by intemperance, etc. It frequently appears in the throat after scarlatina in severe form. If relief is not afforded by the internal administration of opium (to allay the pain), and of quinia, or some other preparation of bark, wine, beef-tea, etc., to improve the tone of the constitution, together with astringent and sedative local applications, recourse must be had to the destruction of the part by strong nitric acid, or some other caustic.

The terrible disease known in civil practice as SLOUGHING PHAGEDÆNA, and in military and naval practice as HOSPITAL GANGRENE, is merely, according to some of the highest surgical authorities, a state of P. in its fullest development. This disorder requires for its development the influence of some of those undefined causes which regulate the outbreak of epidemics, and is peculiarly contagious and infectious. It is engendered usually by the overcrowding of sick and wounded men, and some idea of its virulence may be formed from the fact that, on the return of the French fleet from the Crimean war, no less than 60 deaths from its occurred in one ship in the course of 38 hours. It is not frequent in the London hospitals; but it broke out in the Middlesex Hospital 1835, in University College Hospital 1844, and in St. Bartholomew's and St. George's Hospitals 1847 (Druitt's *Surgeon's* Vade Mecum, 8th ed., p. 72, *note*). For details respecting this disorder, see Hennen's *Principles of Military Surgery*, Boggie *On Hospital Gangrene*, and the article on 'Gangrene,' by Mr. Holmes Coote, in Holmes's *System of Surgery*, I.

PHAGOCYTE, n. *făg′ō-sīt* [Gr. *phagō*, I eat; *kutos*, cell]: *Biol.:* a leucocyte that takes into its substance and devours bacteria and other noxious matters. Phagocytes also devour the elements of organs peculiar to the larval stage, and later themselves become food for the developing organs of the adult. PHAGOCYT′IC, a. pertaining to phagocytes. Phag'ocytism, n. action or function of a phagocyte. Among statements based on recent microscopic examination of the blood is one to the effect that the white corpuscles, or globules, of the blood of living animals possess the power of devouring disease-germs that have gained entrance to the living tissues. These white corpuscles are regarded as living cells, composed of protoplasm, and able to make their way through the walls of blood-vessels, and to pass among the body's tissues. The principal advocate of the theory of phagocytes, the Russian Metschnikoff, sums up his belief by saying that 'the animal body possesses a formidable means of resistance and defense against these infectious agents'—the bacilli: see Blood: Cell-theory.

PHAIOPHYLL, n. *fī'ō-fĭl* [Gr. *phaios*, dusky; *phullon*, a leaf—from *phuō*, I produce]: a group of coloring matters in the leaves of plants, comprising various browns, soluble in water.

PHALACRO'CORAX: see Cormorant.

PHALÆ'NA: see Moth.

PHALANGER, *fa-lăn'jėr*, or Phalangist, *fa-lăn'jĭst* [named from the formation of the hind-feet], (*Phalangista*): genus of marsupial quadrupeds, having a rather short head, short ears, short woolly fur, a long prehensile tail, sometimes completely covered with hair, and sometimes only at the base, and scaly toward the extremity; the dentition somewhat various as to the number of premolars, the incisors always six in the upper jaw and two in the lower, the true molars eight in each jaw, the canines of the lower jaw very small, and close to the incisors. The fore-paws are strong, and capable of much use in grasping food and bringing it to the mouth. A number of species inhabit Australia and the islands northward. They live chiefly in trees, and feed on insects, small animals of various kinds, eggs, and fruits. The Sooty P. or Tapoa (*P. fuliginosa*) is common in Van Diemen's Land, and is much sought after for its fur, which is of uniform smoky-black color, or tinged with chestnut, warm and beautiful. The tail is very bushy. It is nocturnal in its habits.—The Vulpine P. (*P. vulpina*), called also Vulpine Opossum, is very plentiful and widely diffused in Australia: length from point of muzzle to root of tail, about 26 inches; bushy tail about 15 inches long; color grayish-yellow on the upper parts, and tawny-buff below. The fur is not so much valued as that of the Vulpine P., but is used for various purposes. The flesh, though it has a strong peculiar flavor, is a favorite food of the Australian aborigines.—Nearly allied to this genus is the genus *Cuscus*, of which one species, whitish-gray, spotted with brown, is plentiful in the Molucca and Papuan Islands.—Allied to the phalangers are also the Flying Phalangers (q.v.).

PHALANGES, n. plu. *fă-lăn′jēz* [Gr. *phalangx*, a line of battle; *phalanggos*, of a line of battle]: the small bones of the fingers and toes, so named from their arrangement in rows; in *bot.*, bundles of stamens; stamens divided into lobes like a partite or compound leaf. Phalangal, a. *fă-lăng′găl*, or Phalangeal, a. *făl′ăn-jē′ăl*, of or relating to the small bones of the fingers and toes, which are arranged in rows, one before the other, in front of the wrist and ankle.

PHALANGIIDÆ, *făl-ăn-jī′ĭ-dē* [Gr. *phalanggion;* L. *phalangium*, kind of venomous spider]: family of trachearian Arachnida, popularly called *Harvest-men*, some of the species appearing in great numbers in fields during the hay and corn harvests. They resemble spiders in general form, though their organs of respiration are very different. Their legs are extremely long and slender. Most of the species are very agile. Phalangid′ea, order of tracheate Arachnida. Phalan′gium, typical genus of the family Phalangiidæ—known usually in the United States as *daddy-long-legs.* They are perfectly harmless.

PHALANGIOUS, a. *fă-lăn′jĭ-ŭs:* pertaining to a genus of spiders having very long legs, called Phalangium, *-jĭ-ŭm*, and also the harvest-man or harvest-bug.

PHALANSTERE, *făl′an-stēr*, or Phalanstery, *făl′ăn-stĕr-ĭ* [F. *phalanstère*—from *phalange* (phalanx) and *-stere;* word formed on the model of *monastère*, monastery]: building or group of buildings designed to house one of Fourier's *phalanges*, or socialistic organizations: see Fourier, François Marie Charles. Phalanste′rian, a. pertaining to a phalanstere. Phalanste′rianism, or Phalan′sterism, n. organization of society into phalansteres; Fourier's system of social reform.

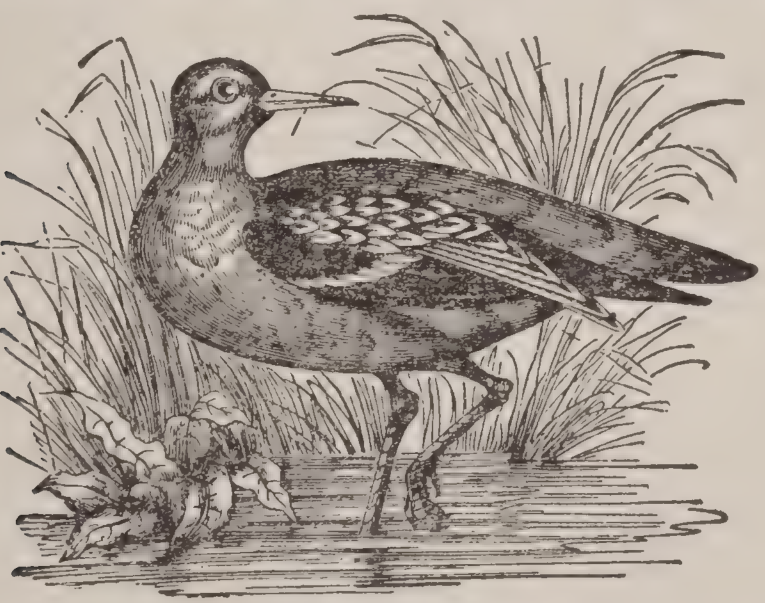
PHALANX, n. *făl′ăngks*, Phalan′ges, Phal′anxes, n. plu. [Gr. *phalangx*, a line of battle]: ancient Greek formation for heavy infantry, which won for itself a reputation of invincibility. It may be described as a line of parallel columns, rendered by its depth and solidity capable of penetrating any line of troops. The oldest P. was the Lacedæmonian or Spartan, in which the soldiers stood eight deep; the Athenian P. had been the same, until, at the battle of Marathon (B.C. 480), Miltiades reduced the depth to four men in order to increase his front. When Epaminondas organized the Theban army against Sparta, he felt that the Spartan line of battle would be impregnable to troops organized in their own manner. He therefore increased the depth and lessened the front of his P., which enabled him to burst through the Spartan line, inflicting the sanguinary defeat of Leuctra, B.C. 371. Philip of Macedon had learned the art of war under Epaminondas, and when he resolved to make his state a military power, he formed the celebrated Macedonian P. (B.C. 359), which enabled him to conquer Greece, and with which his son Alexander subdued the eastern world. The Macedonian P., as the latest form that organization assumed, and as the shape in which the P. encountered the military skill of the west, is worthy of description. The line was 16 deep: a grand-P., comprising 16,384 *hoplites*, or heavy-armed soldiers, sub-divided as follows: the grand-P. was composed of four phalanxes or divisions, each under a gen. officer, called a *phalangarch;* his command was divided into two brigades or *merarchies* (sometimes called *telarchies*), each of these comprising two regiments, or *chiliarchies*, of four battalions or *sýntagmata* each. A *syntagma* corresponded accurately to a modern battalion, except that it was smaller. It was a perfect square, with 16 men each way; was commanded by a *syntagmatarch* or *xenagos;* and had an adjutant, with one or two other staff-officers who stood behind. Eight files united were under a *taxiarch;* four under a *tetrarch*, corresponding probably to a modern capt.; two files were under a *dilochite* or subaltern. A single file of 16 men was called a *lochos*, and the best man was placed at its head; a picked man, the *ouragos*, also marching in the rear. The arms of all these phalanx-men were pikes or spears, 24 ft. long, of which 6 ft. were behind and 18 ft. held in front of the combatant. As each man occupied with his shield 3 ft., the P., when it advanced, had six tiers of spear-points in front, a wall of steel which no troops could withstand, especially as the bearers of the spears were pressed on by the ten ranks in their rear. By rapid movements the P. could change front, form in close column of syntagmata, and execute other critical manœuvres.—The heavy-armed P. was ordinarily flanked by *peltastes* or light infantry, similarly formed, but only eight deep, while the cavalry were but four deep. The P., as representative of the heavy formation, came in contact with the lighter legion of Rome during the wars of Pyrrhus in Italy.—At the great battle of Heraclea (B.C. 279), the P. won the day; but the victory was attributable to other causes as much as to any superiority of formation.

Phalanx designates also the group of about 1,800 persons living together, in Fourier's plan of a reformed social order (see PHALANSTERE, etc.).

PHALARIS, n. *făl′a-rĭs* [Gr. *phal′ăris;* L. *phalăris* or *phalēris*, the plant canary-grass]: a small genus of grasses, one of which, the canary-grass, is well known for its seeds, called *canary-seed;* the *Phalăris canărien′sis*, ord. *Gramin′eæ.*

PHALARIS, *făl′a-rĭs:* tyrant of Agrigentum in Sicily: about the middle of B.C. 6th c., prob. between B.C. 571 and 549. According to the prevalent tradition, he was infamous for cruelty. He maintained his power 16 years by the aid of foreign hirelings, and, it is said, by putting to death all persons of eminence in his dominions; but at last he fell a victim to popular indignation. He gratified, we are told, his love of cruelty by causing persons to be roasted alive in a brazen bull, which was made for that purpose—the first victim being the maker, Perillus. Cicero calls him the 'most cruel of all tyrants' (*crudelissimus omnium tyrannorum*). Yet some doubt attaches to this view of his character, partly because many of the crimes laid to his charge are intrinsically improbable, partly because later traditions represent him as fond of literature and philosophy, and a patron of learned men. Lucian affirms that he was naturally a man of a mild and humane disposition. How far the later view should be allowed to modify the earlier, it is—in the absence of all reliable knowledge—impossible to say. It is under the later and milder aspect that P. is shown to us in the famous but spurious *Epistles of Phalaris*: see BENTLEY, RICHARD.—The theory has been advanced that P.'s cruelties were not so much personal as they were a phase of religious fanaticism—the customary human sacrifices of the ancient and horrid Baal-worship (see BAAL), which from Phœnicia had passed to Rhodes and prevailed there, which the Rhodians had brought to Gela when they founded it, and which thence passed to Agrigentum. Human sacrifices by fire to Baal were common in Carthage, in connection with an image of brass.

PHALAROPE, n. *făl'ăr-ōp* [Gr. *phalēros*, white, having a white spot—from *phalos*, shining; *pous* or *poda*, a foot], (*Phalaropus*): genus of birds of family *Lobipedidæ* (q.v.); having a rather long, slender, weak, straight bill, resembling that of the sandpipers, which, indeed, they otherwise much resemble, though differing in their aquatic habits; the greater part of their time being passed in swimming on the sea, where they seek mollusks and other small marine animals for their food. The GRAY P. (*P. lobatus*), though formerly so rare a bird in Britain that Pennant says he knew of only two instances of its occurrence in his time, is now frequently seen in its autumn migration from its northern abode to its southern winter quarters. It breeds in the arctic regions both of the old and the new world, migrating s. in both on



Gray Phalarope (*P. lobatus*).

the approach of winter. Its entire length is rather more than eight inches. The tail is short. It is a beautiful bird, and remarkable for the great difference of its summer and winter plumage, the prevailing tint in winter being a delicate gray; in summer the upper parts exhibiting a fine mixture of black, white, and yellow, and the breast and under parts reddish-chestnut. Wilson's P. is the handsomest and the largest species: it is confined to America, breeding from the northern states northward, and migrating in winter to various parts of S. America.

The RED-NECKED P. (*P. hyperboreus*, or *Lobipes hyperboreus*, a generic distinction being made by Cuvier and others, on account of the sharper and more slender bill) breeds in some northern Scottish islands, though more frequently in more n. regions. It is rather smaller than the Gray P., graceful in form and movements, and finely colored. The phalaropes are very fearless of man, and easily tamed. Their flesh is oily and unpalatable.

PHALLUS, n. *făl'lŭs* [Gr. *phallos*, the male organ]: emblem of the generative power in nature, carried in solemn procession in the Bacchic orgies in anc. Greece. PHAL'LIC, a. *-lĭk*, pertaining to the *phallus*, or to the indecent rites connected with the orgies of Bacchus; pertaining to the worship of the generative principle.—The *Phallus*, a representation of the male generative organs, was an object of common worship throughout the nature-religion of the East, and was called by manifold names, e.g., Linga (q.v.), Yoni, Pollear, etc. Originally, it had no other meaning than the allegorical one of that mysterious union between the male and female, which throughout nature seems to be the sole condition of the continuation of the existence of animated beings; but at a later period, particularly when ancient Rome had become the hotbed of all natural and unnatural vices, its worship became an intolerable nuisance, and was put down by the senate on account of the more than usual immorality to which it gave rise. Its origin has given rise to much speculation, but no certainty has been reached by investigators. The Phœnicians traced its introduction into their worship to Adonis, the Egyptians to Osiris, the Phrygians to Attys, the Greeks to Dionysus. The common myth concerning it was the story of some god deprived of his powers of generation—an allusion to the sun, which in autumn loses its fructifying influence. The procession in which it was carried about was called Phallagogia, or Periphallia, and a certain hymn was sung on that occasion, called the Phallikon Melos. The bearers of the phallus, which generally consisted of red leather, and was attached to an enormous pole, were the Phallophoroi. Phalli were on those occasions worn as ornaments round the neck, or attached to the body. Aristotle traces the origin of comedy to the ribaldry and the improvised jokes customary on those festivals. Phalli were often attached to statues, and of a prodigious size; sometimes they were even movable. At a procession of Ptolemy Philadelphus, a phallus was carried about made of gold, and 120 yards long. Before the temple of Venus at Hierapolis there stood two phalli, 180 ft. high, upon which a priest mounted annually, and remained there in prayer for seven days. The phallus was an attribute of Pan, Priapus, and to a certain extent also of Hermes.

PHAL′LUS: genus of fungi of the division *Gasteromycetes*, egg-shaped, the outer covering at length bursting to permit the growth of a stem, the receptacle which produces the spores, and which is surmounted by a rudimentary *pileus.* A common species, *P. impudicus* or *fœtidus*, popularly called *Stinkhorn*, is as large as a hen's egg, growing underground in thickets, and finally sending up a stem 4–6 inches high, the fetid smell of which is noticeable for many yards around. The egg is full of a jelly-like substance. The growth of the stem is very rapid, and it soon decays.

PHANERITE SERIES, *făn′ĕr-īt* [Gr. *phan′ĕros*, evident, visible—from *phainō*, I show]: in *geŏl.*, a term sometimes employed to designate the uppermost stage of the earth's crust, consisting of deposits produced by causes in obvious operation.

PHANEROGAMIC, a. *făn′ĕr-ō-găm′ĭk*, or PHAN′EROGA′MIAN, a. *-gā′mĭ-ăn*, or PHAN′EROG′AMOUS, a. *-ŏg′ă-mŭs* [Gr. *phanĕros*, manifest; *gamos*, marriage]: in *bot.*, applied to plants having conspicuous flowers containing stamens and pistils—opposed to *cryptogamic.* PHANEROGAMS, n. plu. *făn-ėr′ŏ-gămz*, or PHANEROGAMOUS PLANTS, plants which have true flowers, and in which the sexual organs (stamens and pistils) are distinctly notable. They are called also FLOWERING PLANTS (see also PHÆNOGAMOUS), being by all these names distinguished from Cryptogamous Plants (q.v.). The seeds originate from Ovules (q.v.), and already contain the young plant, more or less perfectly formed, called the *embryo.* Phanerogams number about three-fourths of all known plants. Among them are included all the larger plants, and all plants of great importance in an economic view. They are generally divided into *Monocotyledonous* or *Endogenous Plants*, and *Dicotyledonous* or *Exogenous Plants.*

PHANTASCOPE, n. *făn′tă-skōp* [Gr. *phantas′ma*, an image—from *phainō*, I show; *skopĕō*, I view]: an optical instrument enabling persons to look cross-eyed, thus giving an appearance of motion to figures for the purpose.

PHANTASIASTS, n. plu. *făn-tăz′ĭ-ăsts* [Gr. *phantasiazō*, I cheat with vain appearances]: in *chh. hist.*, a division of the Monophysite sect in the 6th c., followers of Julian of Halicarnassus in believing that the Divine nature had so insinuated itself into the body of Christ from the very moment of his conception that it became incorruptible, and did not feel real hunger, thirst, fatigue, or pain, but only semblances thereof. The P. were called also Aphthartodocetæ, Docetæ, and Manicheans: see MANICHEAN.

PHANTASM, n. *făn′tăzm*, or **PHANTASMA**, n. *făn-tăs′mă* [Gr. *phantas′ma*, an image]: something that appears only to the imagination or to the mind; a vision; a spectre. PHANTAS′MAL, a. *-măl*, pertaining to.

PHANTASMAGORIA, n. *făn-tăs′mă-gō′rĭ-ă* [Gr. *phantasma*, an image, a spectre; *agŏra*, a meeting or collection of people—from *ageirō*, I collect]: a magic-lantern with slides, by which figures are largely magnified on a wall or screen, and made to appear as if in motion. PHANTAS′MAGO′RIAL, a. *-gō′rĭ-ăl*, pertaining to. PHANTAS′MATOG′RAPHY, n. *-tŏg′ră-fĭ* [Gr. *graphō*, I describe]: a description of celestial appearances, such as rainbows, halos, and the like.

PHANTASTIC and PHANTASY: see FANTASTIC and FANTASY.

PHANTOM, n. *făn′tŏm* [Gr. *phantasma*, an image: It. *fantasima:* F. *fantôme*, OF. *fantosme*, a spirit, a ghost: same as PHANTASM, which see: Gr. *phainein*, to show—from *phaein*, to shine]: that which has only an apparent existence; a spectre; a fancied vision; a spirit.

PHANTOMNATION, *făn-tom-nā′shŭn* [derived from a printer's error uniting two words in a line of Pope, 'the phantom nations of the dead': the word does not really exist]: term which was inserted in an English dictionary, as a title-word with a definition, and credited to Pope. This misapprehension was ludicrous enough; but the word became an amusing and surprising illustration of the self-perpetuating power of a linguistic mistake. Thus in the *Imperial Dictionary* (Blackie and Son, London; The Century Co., New York; 1883), in the *Encyclopædic Dictionary* (Cassell and Co., London 1886), in *Webster's Unabridged Dictionary* (1880), and in other works of the highest standing, P. appears—defined as 'an illusion,' etc., its use credited to Pope; and marked as 'obsolete' or 'rare.'

PHARAOH, *fā′rō* or *fā′rā-ō:* official title of the Egyptian kings; given by the Hebrews as a proper name to the monarch ruling in Egypt at the time, as Cæsar was applied to the Roman emperors, and as Khan is to the Tartar, and Shah to the Persian, rulers. The word is of uncertain etymology, being capable of two derivations—viz., either *Pa ra*, 'the Sun,' the leading or first title of all Egyptian monarchs; or the popular expression, *Pi ouro*, or *Phouro*, 'the King.' It is even possible also to derive it from *Pa har*, 'the Horus,' another title of Egyptian monarchs. Great difficulties have been encountered in attempting to determine the particular monarchs who pass under this name in the Scriptures. The first-mentioned P. is the one in whose reign Abraham visited Egypt, who is supposed by some chronologists to have been one of the Shepherd Monarchs; but nothing beyond mere conjecture supports this theory. Another P. is the one in whose reign Joseph was brought to Egypt, and who was supposed by Eusebius to be Apophis, one of the later Shepherd Kings of the 17th dynasty, who are known from the monuments to have immediately preceded the 18th. Bunsen indeed places the arrival of Joseph in the reign of Usertesen, or, as he reads his name, Sesertesen I. of the 12th dynasty, in which indeed a famine is stated in the hieroglyphical texts to have occurred, and in which it appears numerous officers were established to take charge of the grain. Arguments may be adduced for Joseph's arrival in the time of the 12th dynasty, from the fact of the establishment of the family of Jacob in the land of Goshen, the importance to which Joseph had risen, and the omission of the name of any of the principal Egyptian cities in the narrative, and the fact of Joseph having married Asenath, daughter of Potipherah, priest of Heliopolis, a city evidently the seat of the court under the 12th dynasty, as Ouar or Avaris was under the Shepherds. Equal difficulty has been experienced in determining the P. who reduced the Israelites to bondage, employed them in the labors of the brick-field, and compelled them to build the treasure-cities of Pithom and Rameses. This P. appears to have meditated the total absorption of the Hebrews into the Egyptian race. All that is clear from the narrative is that the city of Rameses was called after his name, in the same manner as modern forts have been by contemporary rulers. Now, frequent mention occurs in the Papyri and other texts of the *Makatalu en Ramessu* or Tower of Rameses II. (Rameses the Great) which is represented on the walls of Medinat-Abu; and this has induced Lepsius and Bunsen to depress the date of the Exodus from B.C. 1491 to the close of the 19th dynasty, or after Rameses II.—a point controverted by other chronologists, who wish to elevate it to the middle of the 18th dynasty, or B.C. 1732. To synchronize the former date, Lepsius takes the rabbinical date of B.C. 1314 for the Exodus, or B.C. 1340 for the birth of Moses. The P. of the Exodus is supposed to be Merienptah or Menephthes, son and successor of Rameses II. Philologically, this explanation is preferable, as the fixed point in the inquiry is the name of the Migdol of Rameses found both in the Scriptures and on the monuments of Egypt: the most recent investigations favor this solution of the question: see EGYPT: MOSES. Other Pharaohs are mentioned in history—e.g., the father of Tahpenes, who was wife of Hadad and mother of Genuboth; the P. whose daughter Solomon married; P. Nechao, or Necho II., who gave battle to Josiah, King of Judah, whom he slew at Megiddo, who also made war against the Syrians, defeated them at Magdolus, and took Cadytus or *Katsh*, on the *Arunata* or Orontes. He was subsequently defeated by Nebuchadnezzar at Carchemish B.C. 607. P. Hophra was the Uaphris or Apries of the Greeks, whose destruction was prophesied by Jeremiah, and who was strangled B.C. 570.—Bunsen, *Ægyptens Stelle;* Lepsius; Nash, *The P. of the Exodus* (1862); Maspero; Brugsch; and the works named under EGYPT.

PHARAONIC, a. *fā′rā-ŏn′ĭk:* pertaining to the *Pharaohs* or to the anc. Egyptians.

PHARISEE, n. *făr′ĭ-sē* [Gr. *pharĭsai′os*, a Pharisee—from Heb. *párash*, to separate]: member of a party prominent among the Jewish people at the time of Christ, strict observers of the letter of the law, and of the traditions of the Elders, and pretenders to superior sanctity, whence their name, meaning separatists (see Pharisees). Phar′isa′ic, a. *-sā′ĭk*, or Phar′isa′ical, a. *-sā′ĭ-kăl*, pertaining to the Pharisees; ritual; externally religious. Phar′isa′ically, ad. *-lĭ*. Phar′isa′icalness, n. *-nĕs*, the state of being pharisaic. Phar′isa′ism, n. *-ĭzm*, the doctrines or practices of the Pharisees; the rigid observance of the external rites and forms of religion without genuine piety; obedience in letter and not in spirit; hypocrisy in religion; 'obedience petrified into formalism, religion degraded into ritual, and morals cankered by casuistry.'

PHARISEES, *făr′ĭ-sēz* (*Perishin* or *Perushim*, Separatists): so-called 'Jewish sect,' more correctly a Jewish school, which probably dates as a distinct body or party from the time of the Syrian troubles, and whose chief tendency was to resist all foreign, chiefly Greek, influences that threatened to undermine the sacred religion of their fathers. They emphatically took their stand on the Law, together with those inferences from its written letter which had, partly from time immemorial, been current as a sacred tradition among the people. Out of the small band of the Chasidim (q.v.), the P. had taken their rise originally as *Chaberim*, Friends, Colleagues, Scholars—in contradistinction to the *Am-Haarez*, or common people—and their chief object in life was the study and further development of the Divine Law. Principally distinguished by their most scrupulous observance of certain ordinances relating to things clean and unclean, they further adopted among themselves various degrees of purity, the highest of which, however, was scarcely ever reached by any member of their community. For every degree, a special course of instruction, a solemn initiation, and a novitiate was necessary; all of which, together with a certain distinction in dress, seems to have been imitated from them by the Essenes (q.v.). The name of P. or Perushim was probably bestowed on them at first in derision by the Sadducees or Zadokites—the priestly aristocracy and their party, the Patricians, who differed from them politically and to some extent in religious matters. The P. had no special 'Confession of Faith,' or articles of creed different from the whole body of Jews. The Bible, as interpreted by the traditional Law, was their only code. Obedience to this Law, strictest observance of all religious and moral duties, submission to the Divine will, full confidence in the wisdom and justice of Providence, firm belief in future reward and punishment, chastity, meekness, and forbearance—these were the doctrines inculcated in their schools. They were, in fact, nothing more or less than the educated part of the people, who saw in rigid adherence to the ancient religion, as it had developed itself in the course of centuries, the only means of saving and preserving the commonwealth, notwithstanding all its internal and external troubles. Hence, they wished the public affairs, the state and all its political doings, to be directed and measured by the standard of this same Divine Law; without any regard for those aristocratic families who ruled, or at least greatly influenced, the commonwealth. These consisted of the priestly families, the Zadokites (Sadducees, q.v.), and of the valiant heroes and sagacious statesmen who had brought the Syrian wars to a successful issue, and had, by prudent negotiations with other courts, restored the nation to its former greatness, and, on their own part, had acquired wealth and fame, and freer and wider views of life and religion. The Sadducees held the modern doctrine, that religion and state were two totally different things; that God had given man the power of taking his matters into his own hands; and that it was foolish to wait for a supernatural interference, where energy and will were all that was required. Naturally, the political difference between the two parties by degrees grew into a religious difference; since the Jewish state was one still completely pervaded by the religious element—as indeed it had begun as a theocracy, and could still to a certain extent be called by that name. And the more the Sadducees lost their influence—the people siding with the P.—the more the religious gulf must have widened between them; though the divergence between them, as far as our authorities—Josephus, the New Testament, and the Talmud—go, does not seem to have been very grave. Thus, the P. assumed the dogma of immortality, chiefly with a view to a future reward of good and evil deeds in this world; while the Sadducees, without denying—as we are erroneously informed by Josephus—this dogma, yet held that there was nothing in the Scriptures to warrant it, and, above all, that there was no need of any future reward; at any rate, that a pious life with a view to future reward was not meritorious. This position of the Sadducees seems analogous to that of the agnostics of the present day—depriving the doctrine of immortality of all practical influence on conduct and character. While the P. held all the traditional ordinances in equal reverence with the Mosaic ones, tracing, in fact, most of the former to Sinai itself, the Sadducees rejected, or rather varied, some of these according to the traditions of their own families: these ordinances relating chiefly to priestly and sacrificial observances, certain laws of purity, and some parts of the civil law. It may perhaps even be assumed, with some recent investigators (chiefly Geiger), that the P. were representatives of a newer Halacha, dictated by an oppositional and religious and national zeal which carried them far beyond the original boundaries. Certain other legal differences between the two parties, such as the application of the laws of inheritance to daughters, or of the responsibility of the master for his servants, are nothing more than political party-views in a religious mask, which were meant to meet certain special isolated cases only. In general, the P. handled justice in a much milder manner than their antagonists, who took their stand upon the rigid letter, and would hear of no mercy where a violation of the code was clearly made out. Out of the midst of the P. rose the great doctors and masters of the Law (*Soferim*, Scribes; *Nomodidaskaloi*, teachers of the Law), and to them were intrusted by the later rulers the most important offices.

Until recently, great misconception has prevailed even among scholars respecting this patriotic, pious (in the legal sense), learned, and national party of progress. That there were among them those who were a disgrace to any party, and, still more, to their strict one, no one knew better than the P. themselves; and in bitterer words than were ever used by Christ and the apostles, the Talmud castigates certain hyperpious members of their own community as the 'plague of Pharisaism.' These hypocrites were characteristically styled *Zebuim* [dyed, painted ones], 'who do evil deeds like Zimri, and require a godly reward like Phinehas.' Seven kinds of P. are enumerated in the Talmud, six of whom were not to be counted as real Pharisees—viz., (1) they who did the will of God for earthly motives; (2) those who made very small steps, or said: Wait for me—I have still some good deed to do; (3) those who knocked their heads against walls, lest they might look at a woman; (4) *ex-officio* Saints; (5) those who say: Tell me of another duty; (6) those who are pious, because they *fear* God. The only genuine Pharisee was he 'who did the will of his Father in Heaven, because he loved Him.' Josephus's accounts, distortions in themselves, have, to add to the confusion, been misunderstood (thus, e.g., the word which he uses to designate the three parties, Pharisees, Sadducees, Essenes, never meant 'sect,' as it has commonly been interpreted); and the position of Christ, in relation to the P., can never be understood properly without a full acquaintance with the circumstances of the time, to which there is no other way than a knowledge of that literature (the Talmud and Midrash), so long neglected. Christ found the influence of the P. predominant among the people, though the Sadducees were in reality the ruling class and allies of the reigning dynasty. He naturally sided with the democratic party of the P. against that of the proud opposite camp. As for the religious tendencies of the latter—the Sadducees (q.v.)—the people had decided that point already practically, by siding with the Pharisees. Once only an allusion is made also to the leaven of Herod = the Sadducees (Mk. viii. 15, comp. Matt. xvi. 6). But it was, above all things, necessary to combat the ever-growing tendency to choke all real piety and genuine virtue of heart under external ceremonies and observances, which, unless guarded against, will appear, instead of a mere symbol and memento, the essence of religion itself, and thus become in time a delusion and bondage, ending in that vile hypocrisy against which the Talmud fights with all its powers of derision, and Christ inveighs in much more vehement terms than is his wont. It was not in themselves that these 'oral laws' were held up to scorn. They were a necessary and natural growth, and acted, in the main, beneficially; as is now fully recognized by scholars of eminence. (For some further remarks on the subject, see Talmud.)

Pharisaism—from which gradually branched off the wild democratical party of *Zealots* (Kannaim), and which for the last time represented political opinions in the revolution of Bar-Cochba—has, from the downfall of the sanctuary, and the final destruction of the commonwealth, till at least within the present generation, remained the principal representative of Judaism as a creed only, Sadduceeism dying out, or, at all events, producing only one such sterile plant as Karaism. See Jewish Sects: Sadducees.

PHARMACEUTICAL, a. *fâr′mă-sū′tĭ-kăl*, or Phar′maceu′tic, a. *-sū′tĭk* [Gr. *pharmakei′ă*, the using of medicine; *phar′măkon*, a drug]: of or relating to pharmacy, or to the art of preparing medicines. Phar′maceu′tically, ad. *-lĭ*. Phar′maceu′tics, n. plu. *-tĭks*, the science of pharmacy, or of preparing medicines. Phar′maceu′tist, n. *-tĭst*, one who practices pharmacy or prepares medicines; an apothecary.

PHARMACIEN, n. *fâr-măs′ĭ-ăng* [F.]: a duly qualified pharmaceutist.

PHARMACOGNOSIS, n. *fâr′mă-kŏg-nō′sĭs*, or Phar′macog′nosy, n. *-kŏg′nō-sĭ* [Gr. *phar′măkon*, a drug; *gnōsis*, knowledge—from *gignōskō*, I know]: the knowledge of drugs or medicines, their properties and operations; the branch of materia medica which treats of simples, or unprepared medicines.

PHARMACOLITE, n. *fâr-măk′ō-līt* [Gr. *phar′măkon*, a drug or poison; *lithos*, a stone]: a mineral occurring in delicate silky fibres of a white or grayish color—a native arseniate of lime.

PHARMACOLOGY, n. *fâr′mă-kŏl′ŏ-jĭ* [Gr. *phar′măkon*, a drug; *logos*, discourse]: a treatise on the history, proper uses, and composition of drugs; materia medica. Phar′macol′ogist, n. *-jĭst*, a writer on the nature and uses of drugs, or skilled in their use. Pharmacopolist, n. *-kŏp′ŏ-lĭst* [Gr. *pōlĕō*, I sell]: druggist.

PHARMACOPŒIA, n. *fâr′mă-kō-pē′ă* [Gr. *phar′măkon*, a medicine or drug; *poiĕō*, I make]: book of authorized directions for selection and preparation of substances to be used as medicines, including a list of the articles of the Materia Medica (q.v.), with their characters and tests. Almost every civilized country of importance has its own P. The first work of the kind published under govt. authority appears to have been that of Nuremberg, 1542: it was compiled by Valerius Cordus, a student of medicine, and consisted of selections of medical receipts from the works of the most eminent writers on medicine. Before this time, the books chiefly in use among apothecaries were the treatises on simples by Avicenna and Serapion, the *De Synonymis* and the *Quid pro Quo* of Simon Januensis, the *Liber Servitoris* of Bulchasim Ben-Aberazerim, and the *Antidotarium* of Nicolaus de Salerno: an abridgment of this work was known as *Nicolaus Parvus*, the work itself as *Nicolaus Magnus*.

In England a P. was issued first by the College of Physicians 1618—the *London P.;* it was selected mostly from the works named above. For 100 yrs. the *London P.* remained essentially unchanged, retaining the heterogeneous mixtures of mediæval pharmacists, some of them having 20–124 ingredients, and a list of simples embracing such medicaments as earthworms, crabs' eyes, dung, blind puppies, human skulls, etc.: many of these substances figured in the *London P.* till 1746. The first *Edinburgh P.* was pub. 1699, and the first *Dublin P.* 1807.

The first *P. of the United States of America* was pub. 1820. Dr. Lyman Spalding submitted, 1817, to the Med. Soc. of the Co. of N. Y. a project for forming a national P. Delegates from all med. societies and med. schools in the e., middle, w., and s. states were to convene and provide for compilation of a P. in each section. In a general convention to be held at Washington, these 4 compilations were to be referred to a competent commission which was to reduce them to the form of a general P. The e. and middle states submitted each a draft of a P. to the convention at Washington 1820, and the results of their labors appeared in the *P. of the United States*, published at Boston that year, Dec. 15. It was written both in Lat. and Eng. Thereafter a revision of the P. has been made decennially by authority of conventions of medical societies and schools, schools of pharmacy, associations of pharmacists, and representatives of the med. depts. of the army and navy. The 6th revision was pub. 1883. The convention to provide for the 7th revision was held in Washington 1890.

The *P. of the United States* has the titles of the articles arranged under the officinal (Latin) name of each medicinal substance or compound; then follows the English name; and in many cases another Eng. name succeeds, e.g., *Liquor Potassii Arsenitis:* Solution of Arsenite of Potassium: Fowler's Solution. Then is added the method of preparing the medicament—e.g., to prepare diluted solution of sub-acetate of lead, the pharmacist is directed to take of solution of sub-acetate of lead 3 parts, and of distilled water 97 parts. He is then to mix the solution of sub-acetate of lead with the distilled water, previously boiled and cooled: the liquid is to be kept in a well-stopped bottle.

The French P., or *Codex*, is largely in use in Central and S. America, and it is official in Turkey. There is no national P. in Italy, the several provinces having pharmacopœias of their own. Besides the countries named above, the following have national pharmacopœias: Austria, Belgium, Denmark, Germany, Greece, Holland, Hungary, India, Mexico, Norway, Portugal, Russia, Spain, Sweden.—Pharmacopœias of homeopathy also are published. What is now to be hoped for is a universal P., so that the most important medicines of the American, British, and chief continental European pharmacopœias shall be of the same strength.

PHARMACOSIDERITE, n. *fâr′mă-kō-sĭd′ėr-īt* [Gr. *phar′măkon*, drug; *sidērŏs*, iron]: a mineral of various shades of green, inclining to yellow and brown; arseniate of iron.

PHARMACY, n. *fâr′mă-sĭ* [Gr. *phar′măkon*, a medicine or drug: OF. *farmacie*, F. *pharmacie*, pharmacy]: department of *Materia Medica* (q.v.) which treats of the collection, preparation, preservation, and dispensing of medicines: it is synonymous with *Pharmaceutical Chemistry*. It denotes the occupation of a druggist.

Pharmacy touches the medical art on the one hand and chemistry on the other; and the pharmacist needs to be master of the systematic description of articles of the Materia Medica (q.v.), their sources, physical and chemical properties, preparation, compounding, etc., and at the same time to have an acquaintance with the physiological action and the therapeutic and toxic action of drugs. Instruction in P. comprises several branches: 1. Materia medica and botany; in the N. Y. Coll. of P. these branches are taught by object-lessons, the pupil following the lectures with specimens before him of plants, crystals, and other objects constituting the subject-matter. 2. Analytical chemistry, which should be taught by way of actual laboratory work. 3. Practical compounding of medicines. 4. Pharmaceutical assaying, or organic chemical analysis.

There are colleges or schools of P. at Albany, Ann Arbor, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cornell Univ., Denver, Detroit, Kansas City, Kan., Louisville, Madison, Wis., Minneapolis, Nashville, New Orleans, New York, Philadelphia, Pittsburgh, Purdue Univ., Ind., St. Louis, Washington, D. C.—With the exception of Ark., Cal., Fla., Ind., Miss., Nev., Or., Tenn., Tex., Vt., all the states of the Union had, 1890, codes for the effective regulation of the practice of pharmacy.

PHAROS, n. *fā'rŏs* [*Pharos* or *Raudhat-el-tin*—i.e., fig-garden—an island in the Bay of Alexandria, on which King Ptolemy Philadelphus built a famous light-house known by the same name]: a light-house for the direction of seamen; a beacon.

PHAROS, *fā'rŏs* or *fâ'rŏs:* rocky islet off the coast of Egypt, which Alexander the Great connected with Alexandria by the Heptastadium, or Seven-Furlong Mole. The light-house, at its n.e. point, begun by Ptolemy I. and finished about B.C. 280, was one of the wonders of the ancient world. It seems to have been 400 ft. high, and stood 1,600 years. The fire, constantly kept lighted on its summit, was said to be visible 40 m. The island of P. became ultimately a suburb of Alexandria by means of a street extending along the mole. After the time of Julius Cæsar, it relapsed into a mere fishing station.—From the anc. P., any light-house is sometimes so called.

PHARSALUS, *făr-sā'lŭs*, now FERSALA: town of Thessaly, s. of Larissa, on a branch of the Salambria, accordingly in the part of Thessaly restored to Greece 1881. It is historically notable mainly for the great battle here between Cæsar and Pompey, B.C. 48, Aug. 9. Pompey had about 45,000 legionaries, 7,000 cavalry, and a great number of light-armed auxiliaries. Cæsar had 22,000 legionaries and 1,000 German and Gallic cavalry. The battle, which began with an attack on Pompey's left wing, ended in a complete victory for Cæsar, and determined the fate of the Roman world.

PHARYNGEAL, a. *făr'ĭn-jē'ăl* [Gr. *phar'ungx* or *pharung'ga*, the gullet or windpipe: F. *pharynx:* It. *faringe*, the pharynx]: pertaining to or connected with the pharynx. PHARYNGITIS, n. *făr'ĭn-jī'tĭs*, inflammation of the pharynx. PHARYNGOBRANCHII, n. plu. *făr-ĭng'gō-brang'kĭ-ī* [Gr. *brangchia*, gills]: sub-order of Dermopterous Fishes (q.v.), characterized by respiratory processes projecting from above the pharynx into the large cavity of the mouth. The P. have no heart, and are lowest in organization of all fishes. The species are very few. See LANCELET. PHARYNGOGNATHI, *făr-ĭng-gŏg'nā-thī* [*gnathos*, the jaw]: order of fishes, in the system of Müller and Owen; partly *Acanthopterous* and partly *Malacopterous* in the system of Cuvier; some of them also *Cycloid*, and some *Ctenoid*. Their common characteristic is the union of the lower pharyngeals into one bone. PHAR'YNGOT'OMY, n. *-gŏt'ŏ-mĭ* [Gr. *temnō*, I cut]: the operation of making an incision in the pharynx to remove an obstruction or a tumor.

PHARYNX, n. *făr'ĭngks:* that part of the alimentary canal which lies behind the nose, mouth, and larynx. It is a musculo-membranous sac, forming the back part of the mouth; situated on the cervical portion of the vertebral column, and extending from the base of the skull to the level of the fifth cervical vertebra, where it becomes continuous with the Œsophagus (q.v.). Its length is about four inches and a half, it is broader in its transverse than in its antero-posterior diameter, and its narrowest point is at its termination in the œsophagus. Seven *foramina* or openings communicate with

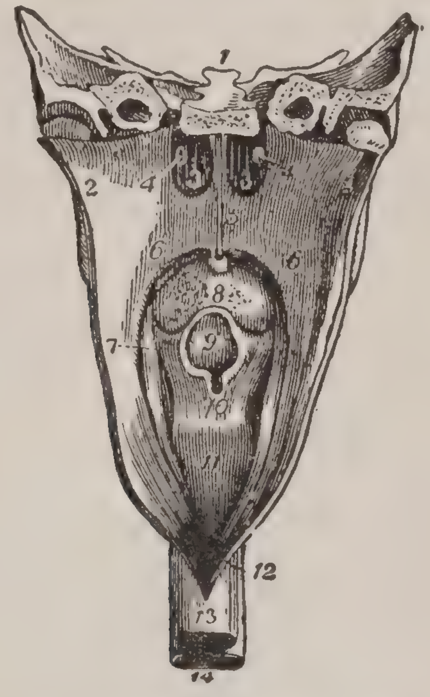


Fig. 1.—The Pharynx laid open from behind:

1, a section of the base of the skull; 2, 2, the walls of the pharynx drawn to either side; 3, 3, the posterior nares, separated by the vomer; 4, 4, the extremities of the Eustachian tubes; 5, the soft palate; 6, 6, 7, 7, its posterior and anterior pillars; 8, the root of the tongue; 9, the epiglottis overhanging; 10, the opening of the larynx; 11, the posterior part of the larynx; 12, the opening into the œsophagus, whose external surface is seen at 13; 14, the trachea.—(From Wilson.)

it—viz.,the two *posterior nares* or nostrils, at the upper and front part of the P.; the two *Eustachian tubes*, opening on the outer surface of the preceding orifices; the *mouth;* the *larynx;* and the *œsophagus.*

The P. is composed of an external *muscular* coat; a middle *fibrous* coat called the *pharyngeal aponeurosis*, thick above where the muscular coat is absent, and gradually thinning as it descends; and a *mucous* coat, continuous with the mucous membrane of the mouth and nostrils. The muscular coat requires special notice. It is composed of a *superior*, *middle*, and *inferior constrictor* muscle on either side, with two less important muscles, the *stylo-pharyngeal* and *palato-pharyngeal* muscles. When the food, after being sufficiently masticated and mixed with saliva, is thrown, by the action of the tongue, into the P., the latter is drawn upward and dilated in different directions; the elevator muscles (the stylo-pharyngeal and palato-pharyngeal) then relax, and the P. descends; and as soon as the morsel is fairly within the sphere of action of the constrictor muscles, they successively contract upon it, and gradually pass it onward to the œsophagus. Independently of its importance in the act of swallowing, the P. exerts an influence on the modulation of the voice, especially in the production of the higher notes.

The P. is not so frequent a seat of disease as many other parts of the intestinal tube. In cases of Diphtheria (q.v.) it is usually the chief seat of the disease. It is liable to ordinary inflammation or *pharyngitis*—an affection characterized by pain, especially in swallowing, without redness in the fauces or change of voice. Little in the way of treatment, except low diet and attention to the bowels, is required; and the inflammation usually terminates in resolution. Sometimes, however, it proceeds to suppuration, and abscesses—dangerous partly from inanition consequent on inability to take food, but chiefly from suffocation due to pressure on the larynx—are formed. These abscesses are more dangerous in the lower than in the upper part of the P., and are more common in young children than in adults. The treatment consists in opening the abscess, which gives immediate relief; but the operation must be conducted with great care, and the incision made as near as possible to the mesial line, by reason of the large adjacent blood-vessels

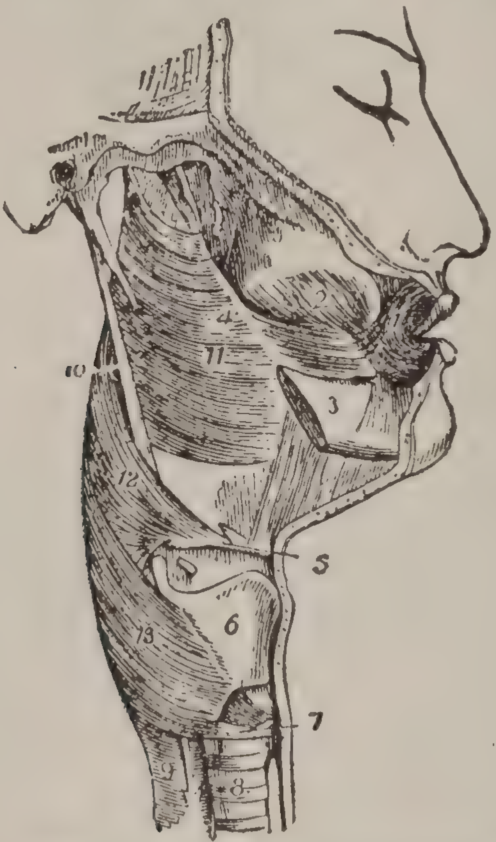


Fig. 2.—External View of the Muscles of Pharynx:

1, the orbicularis oris muscle; 2, the Buccinator muscle; 3, portion of lower jaw, part of which is cut away; 4, pterygomaxillary ligament; 5, the hyoid bone; 6, the thyroid cartilage; 7, the bicoid cartilage; 8, the trachea; 9, the œsophagus, with the recurrent laryngeal nerve lying between it and the trachea; 10, the stylo-pharyngeal muscle, 11, 12, 13, the superior, middle, and inferior constrictor muscles.

PHASCOGALE, *făs-kŏg′a-lē:* genus of marsupial quadrupeds, of which one species, *P. penicillata*, about the size of a rat, gray, with long soft hair and a long tufted tail, is common in most parts of Australia, lives chiefly in the hollows of decayed trees, and preys on small animals of every kind. It is much disliked by the colonists, to whom it is known as the *Tapoa Tafa*, on account of its depredations in poultry-yards and larders. It is very agile and audacious.

PHASCOLOMYS, n. *făs-kŏl′ŏ-mĭs* [Gr. *phaskōlos*, a sac or pouch; *mus*, a mouse]: the wombat of Australia, of which fossil species of very large size have been found in that country in the uppermost Tertiaries: see WOMBAT.

PHASCOLOTHERIUM, n. *făs′kŏl-ō-thē′rĭ-ŭm* [Gr. *phaskōlos*, a pouch; *thērion*, a wild animal]: in *geol.*, a small fossil pouched mammal found in the flagstones of Stonesfield, and of Oolitic age.

PHASE, n. *fāz*, or PHASIS, *fā′sĭs*, PHASES, n. plu. *fā′-sēz* [Gr. *phasis*, appearance; *phainō*, I bring to light—from *phaein*, to shine: It. *fase:* F. *phase*]: appearance or quantity of the illuminating surface exhibited by the moon or other planet; the particular state at any given instant of any phenomenon or appearance, or of any weighty or grave affair; aspect; appearance: transparent green quartz.—*Phases* are the different luminous appearances presented by the moon and several of the planets—sometimes the whole, a part, or none, of the luminous surface being seen from the earth. For the various phases of the moon, and the reasons of them, see MOON. Mercury and Venus, being inferior planets, present to an observer on the earth exactly similar phases to those of the moon; but they require, instead of a month, periods of 116 and 584 days respectively to pass through a complete series of phases. The superior planets, to a certain extent, exhibit phases, but the luminous surface, as seen from the earth, only varies from the full illumination seen when they are in conjunction with the earth to a slightly gibbous appearance when they attain their greatest elongation; and their distance from the sun is so great in comparison with that of the earth, as to render the variation in the form of their luminous surface not observable, except in the case of Mars and occasionally of Jupiter. Galileo was the first to observe the phases of Venus, and he considered them one of the most satisfactory proofs of the Copernican system. The great brilliancy of Mercury, and its nearness to the sun, prevented its phases from being so easily noticed; but they were at last observed by Masius, and have been observed since by many other astronomers. The term phases is frequently applied to designate the successive stages of an eclipse, lunar or solar.

PHASEL, n. *fă'zĕl* [Gr. *phasēlos*, a kidney-bean, a little boat]: the French bean or kidney-bean; the haricot-bean; *Phas'ĕŏlus vulgāris*, ord. *Legumĭnōsæ*, sub-ord. *Papilĭōnācĕæ.* Phaseolites, n. plu. *fă-zē'ō-līts* [Gr. *lithos*, a stone]: a fossil genus of leguminous plants.

PHASE'OLUS: see Kidney-bean.

PHASIANIDÆ, *fā-zĭ-ăn'ĭ-dē:* family of gallinaceous birds, including pheasants, argus, Macartney cock, fowls, impeyans, tragopans, etc.; its limits, however, being extended by some ornithologists to include peacocks and turkeys (*Pavonidæ*), which differ from it by no very considerable character. The hind-toe is higher on the tarsus than the front toes, so that only the tip touches the ground. The wings are short.

PHASIS, n. *fā'sĭs*, Phases, n. plu. *fā'sēz:* see Phase.

PHASIS, *fā'sĭs:* river in Colchis, now called the Rion. It rises in the mountains of Caucasus, flows generally w., and enters the Euxine near the ancient city of Phasis.

PHASMIDÆ, *făs'mĭ-dē* or *făz'-* [Gr. *phasma*, a spectre]: family of orthopterous insects, allied to *Mantidæ*, but differing in having the fore-legs similar to the other legs, and used like them for locomotion, not for combat and prehension; in the want of stemmatic eyes; and in the similarity of the first joint of the thorax to the other joints. They are insects of very extraordinary appearance, inhabiting tropical countries, and spending their lives on trees and shrubs, whose tender shoots they devour. Some resemble green leaves; some resemble brown and withered leaves; while others, wingless, or nearly so, and with much elongated bodies—one species nine inches in length—resemble dried twigs. To these peculiarities they owe their safety from enemies, eluding observation, for their motions are sluggish. Some are known as Leaf Insects, Spectre Insects, Walking-sticks, etc. The larvæ of the P. resemble the perfect insect.

PHEASANT, n. *fĕz′ănt* [OF. *faisan;* L. *phasĭānus;* Gr. *phasĭānos*, a pheasant—said to be from the river *Phasis*, in Colchis, Asia Minor, whence these birds are said first to have been brought]: wild bird reared and preserved for sport. PHEAS′ANTRY, n. *-rĭ*, an inclosure for breeding and rearing pheasants.—*Pheasant* (*Phasianus*) is a genus of gallinaceous birds of family *Phasianidæ;* having a rather short strong bill, a little curved; the cheeks and skin surrounding the eyes destitute of feathers, and warty; the wings short; the tail long, its feathers so placed as to slope down, roof-like, on either side, the middle feathers longest; the tarsus of the male furnished with a spur. The males of all the species are birds of splendid plumage; the females have shorter tails and dull or sombre colors. There are numerous species, natives of warm and temperate parts of Asia. The COMMON P. (*P. Colchicus*) is said to have been brought from the banks of the Phasis (q.v.), in Colchis, to s. Europe, at a very remote period, its introduction being ascribed in classic legend to the Argonauts. From the Phasis it derived its Greek name *Phasianos*, the origin of its name in English and other modern languages. It was soon naturalized in Europe, over almost all whose temperate parts it is now diffused. The date of its introduction into Britain is not known, but was certainly before the end of the 13th c.: it has long been plentiful in plantations and game-preserves, and has been introduced into almost every part of the country suitable to its habits. The abundance of pheasants in Britain, however, is to be ascribed chiefly to careful game-preservation, without which the race would probably soon be extirpated. No kind of game falls so easy a prey to the poacher.

In the Common P., the head and neck of the male are steel-blue, reflecting brown, green, and purple in different lights; the back and wings show a fine mixture of orange-red, black, brown, and light yellow; the breast and belly are golden-red, each feather margined with black, and reflecting tints of gold and purple. The whole length of a male P. is about three ft., of which the tail often measures two ft. The entire length of the female is about two ft. The general color of the female is pale yellowish-brown varied with darker brown, the sides of the neck tinged with red and green. The ordinary weight of a P. is about two and a half lbs.; but when pheasants are abundantly supplied with food, and kept undisturbed, they are sometimes four or four and a half lbs. in weight. The P., unlike the partridge, is polygamous.

The nest of the P. is on the ground, and is a rude heap of leaves and grasses, in which 11 or 12 olive-brown eggs are laid. But in the half-domesticated state in which it exists in many English preserves, the P. does not give that attention to its eggs and young which it does when more wild, and frequently continues to lay eggs for a considerable time, like the domestic fowl;

the eggs being removed by the gamekeeper, and hatched by hens; with eggs from nests found among clover and hay in the season of mowing. Very young pheasants must be carefully supplied with ants' eggs, maggots, etc., and the whole difficulty of rearing them is in their earliest stage. Pheasants feed indiscriminately on berries, seeds, roots, young shoots of plants, worms, insects, etc. Beans, peas, corn, and buckwheat are frequently thrown for them in open places in woods; and they scrape up bulbous and tuberous roots in winter. They roost in trees at no great height from the ground, and poachers sometimes capture them by burning sulphur below them. During the moulting season, they do not ascend trees to roost, but spend the night on the ground, when they fall a ready prey to foxes. They are fond of woods with thick undergrowth, in which, when disturbed, they naturally seek shelter, running while it is possible, rather than taking flight. The male P. takes flight much more readily than the female, which, apparently trusting to her brown color to escape observation, often remains still until the sportsman is almost upon her. The males and females do not associate together except during the breeding season, but small numbers of one sex are often found in company. The 'short crow' of the males begins to be heard in March. In England and Scotland, pheasant-shooting legally begins Oct. 1, and ends Feb. 3. The pheasants turned out from the gamekeeper's breeding-yard into a preserve are in general supplied with abundance of food during winter, and come to the accustomed call as readily as any kind of poultry, so that the sportsmanship of a *battue*, in which they are killed by scores or hundreds, is of the lowest kind. The flesh of the P. is in high esteem for the table.

The female P., in old age, or when from any cause incapable of the functions of reproduction, sometimes assumes the plumage of the male. The P. has remarkable readiness to hybridize with other gallinaceous birds. A hybrid between it and the common fowl is frequent, and is called a *Pero.* Hybrids between the P. and Black Grouse also have occurred; and hybrids are supposed to have been produced between the P. and Guinea-fowl, and the P. and Turkey. None of these hybrids, however, have ever been known to be fertile, except with one of the original species. On the contrary, the offspring of the Common P. and the RING-NECKED P. (*P. torquatus*) is perfectly fertile, a fact urged in argument by those who regard them as mere varieties of one species. The Ring-necked P. is now almost as plentiful in Britain as the Common P.: it is a native of the forests of India and China, and is said not to breed with the Common P. in a truly wild state, though in Britain they readily intermix. It is distinguished by a white ring almost surrounding the neck, and is of smaller size than the Common P., somewhat different in markings, and has a shorter tail.—The Bo-

HEMIAN P. is another variety, of a silvery-gray color.—White pheasants are not very infrequent.—Of other species of P. are DIARD'S P. (*P. versicolor*), native of Java, in which the prevailing color is green; and REEVES'S P. (*P. Reevesii*), native of n. China, in which white is the prevailing color, and the tail is of extraordinary length, so that a bird not larger than the Common P. measures eight ft. in entire length. Of somewhat different type, more nearly approaching the common fowl, are the GOLDEN P. (*P. pictus* or *Thaumalia picta*) and the SILVER P. (*P.* or *Gallophasis nycthemerus*), both natives of China, and both hardy birds, whose introduction into British preserves has been attempted with prospect of success. Both have long been kept in domestication by the Chinese. The Golden P. is one of the most splendid of the tribe. It has a fine crest, and a ruff of orange and black, capable of being erected at pleasure. The tail is very long. The crest and ruff are held in great estimation by anglers for making artificial flies.—LADY AMHERST'S P. (*P.* or *Thaumalia Amherstiæ*), native of China, resembles the Golden P., and with an extremely long tail.—The Silver P. is one of the largest and most powerful of the tribe, and very combative, driving the Common P. from preserves into which it is introduced. The prevailing color of the upper parts and tail of the male is white, finely pencilled with black, the breast and belly purplish-black.—The name P. is locally applied in the United States to gallinaceous birds of allied genera.

PHEAS'ANT-SHELL (*Phasianella*): genus of gasteropodous mollusks of family *Turbinidæ*, whose shells are valued for their beauty, and when they were rare in collections were sometimes sold for extraordinary prices. They are now comparatively cheap and plentiful, being found in great numbers on parts of the Australian coast.

PHEEZE and PHEESE, v. *fēz:* see FEAZE.

PHELPS, *fĕlps*, ALMIRA (HART) (LINCOLN): 1793, July 15—1884, July 15; b. Berlin, Conn.; daughter of Samuel Hart. She commenced teaching a private school at the age of 19, and afterward became principal of a girls' acad. She married Simeon Lincoln 1817; and after his death in 1823, in connection with her sister, Mrs. Emma Willard, she had charge of a girls' seminary in Troy, N. Y. She married Judge John Phelps of Vt. 1831; taught in Penn. and N. J. 1838–41, and in the latter year, with her husband, took charge of the Patapsco Institute near Baltimore. Her husband died 1847, but she remained in charge of the school till 1855, when she retired to Baltimore. She was a member of the American Assoc. for the Advancement of Science, and wrote a number of educational and other works.

PHELPS, Anson Greene: 1781, Mar. 12—1853, Nov. 30; b. Simsbury, Conn. After learning the saddler's trade, he became a merchant in Hartford, and soon opened a branch establishment at Charleston, S. C. He removed to New York 1815, and began dealing in metals and tin-plate; made advantageous investments in real estate, accumulated a large fortune, and engaged earnestly in various benevolent enterprises, to which he was a liberal benefactor. He was interested in foreign missions, and for some time was pres. of the Amer. Board. Besides providing liberally for his 24 grandchildren, he left a large fund, whose income was to be used for benevolent purposes, and bequeathed $371,000 to charitable and religious institutions and societies. He died at New York.

PHELPS, Austin, D.D.: 1820, Jan. 7—1890, Oct. 13; b. W. Brookfield, Mass.: educator. He studied at Hobart College; graduated at the Univ. of Penn. 1837; studied at Andover and Union Theol. seminaries; was pastor of the Pine Street Congl. Church in Boston 1842–48; prof. of sacred rhetoric in Andover Theol. Seminary 1848–79; chairman of the faculty as senior prof. 1869–79; and was made prof. emeritus on resigning 1879. He received his degree from Amherst College 1856. He held the chaplaincy in both branches of the Mass. legislature; and was preacher of the 'election sermon' for the Mass. govt. 1861. He was father of Elizabeth Stuart Phelps Ward. Prof. Phelps's style in writing shows exceeding cultivation, and rises often into high impressiveness: it is always clear and strong. His mental action was orderly, and his lines of thought fall into precise array and move with regular advance. His numerous publications include: *The Still Hour*, a gem of Christian devotional and contemplative literature (Boston 1859, enlarged ed. proof-read just before his death); *Hymns and Choirs* (Andover 1860); *The New Birth* (Boston 1867); *Sabbath Hours* (1870); *Studies of the Old Testament* (1879); *The Theory of Preaching* (1881); *Men and Books* (1882); *My Portfolio* (1882); *English Style* (1883); *My Study* (1885); and *My Note-Book, or Fragmentary Studies in Theology*.

PHELPS, Charles Edward: born Guilford, Vt., 1833, May 1; son of Judge John and Almira H. L. Phelps. He graduated from Princeton College 1852, studied law at Harvard College, travelled in Europe, and became a lawyer at Baltimore. In 1862 he entered the Union army as lieut.col., served at various points, was promoted col. and brevetted brig.gen.; was a member of congress 1865–69, after which he was again a lawyer in Baltimore. He was elected associate judge for 15 years of the Baltimore superior court 1882, and for several years has been prof. in the law school in that city.

PHELPS, Edward John, ll.d.: jurist: b. Middlebury, Vt., 1822, July 11; son of Judge Samuel S. P., and descendant of William P. (q.v.). He graduated from Middlebury College 1840; studied law in the office of Horatio Seymour and at Yale; began practice in his native town 1843, but two years later removed to Burlington, Vt. He was 2d comptroller of the U. S. treasury 1851-53, and was a member of the Vermont state constitutional convention 1870; was lecturer on medical jurisprudence at the Univ. of Vermont, and pres. of the Amer. Bar Assoc. 1880. In the latter year he was defeated as democratic candidate for gov. of Vt. He was law prof. at Yale Univ. several years from 1881; lectured on constitutional law to the students of Boston Univ. 1882; U. S. minister to England 1885-89; 1890 unsuccessful candidate for senator from Vt.; 1892-3 a U. S. counsel before Bering Sea tribunal; d. 1900, Mar. 8.

PHELPS, Elizabeth Stuart: see Ward, Elizabeth Stuart (Phelps).

PHELPS, John Wolcott: 1813, Nov. 13—1885, Feb. 2; b. Guilford, Vt.; son of Judge John P., and descendant of William P. (q.v.). He graduated from West Point 1836, was in the war against the Creeks and Seminoles, and 1838 superintended the removal of the Cherokees from Florida to the west. In the Mexican war he served with distinction, was commissioned capt. 1850, travelled in Europe 1852, spent some time with the Utah expedition, and resigned from the army 1859. On the opening of the civil war he was made brig.gen., and served at various points. He endeavored to organize a military company of slaves, but was not sustained by the govt. and resigned 1862, Aug. 21. When blacks were enlisted, he was offered the rank of maj.gen., but declined. He was a prolific writer, a strong opponent of masonic orders, and presidential candidate of the American party 1880. Among his works were *Good Behavior* (1880), and a *History of Madagascar* (1884). He died in Vermont.

PHELPS, Noah: 1740, Jan. 22—1809, Mar. 4; b. Simsbury, Conn. He was a militia capt. at the opening of the revolution, was an ardent patriot, was one of the projectors of the attack on Fort Ticonderoga 1775, and was the spy who ascertained the condition of the defenses. He was promoted col. 1779, and the following year was employed in transporting cannon to Boston for use on shipboard. After the war he served several terms in the Conn. legislature, and was also a brig.gen. of the state militia. He died at Simsbury.

PHELPS, Oliver: merchant: 1749-1809, Feb. 21; b. Windsor, Conn. He was for several years in a country store in Suffield, and afterward became a successful merchant in Granville, Mass. During the revolution he was connected with the commissary dept. of the army. In company with Nathaniel Gorham, he bought more than 2,000,000 acres of land in w. N. Y., which had been ceded to Mass. He devised the system of township survey now used by the U. S. govt., and it is said that at Canandaigua, N. Y., he opened the first land office in this country. With William Hart and others he purchased from Conn. the 'Western Reserve,' a tract of 3,300,000 acres of land in O. He was interested in the Erie and Welland canals, in steamboat building, was in congress 1803–05, and served as circuit-court judge. He died at Canandaigua.

PHELPS, THOMAS STOWELL: born Buckfield, Me., 1822, Nov. 2. He graduated from the U. S. Naval Acad. 1846, served in the war with the Indians in Washington Terr. 1855–6, and was with the Paraguay expedition 1858–9. He was actively employed throughout the civil war, prepared numerous surveys, located buoys, performed the initial work for various expeditions, and rendered brilliant service in several conflicts with Confederate batteries and vessels. He was made lieut. 1855, lieut.commander 1862, commander 1865, capt. 1871, commodore 1879, rear-admiral 1884. In 1885 he retired. His work, *Reminiscences of Washington Territory*, was published 1882.

PHELPS, WILLIAM: 1599, Aug. 19—1672, July 14; b. Tewksbury, England. He emigrated to America 1630, and founded the town of Windsor, Conn., 1635. He was prominent in the affairs of the colony, being a justice of the first Conn. court, foreman of the first grand jury, and for many years a magistrate. He was a rigid and devout Puritan. His descendants are eminent in civil and political circles, one of them, Edward John P., being minister to England during the Cleveland administration. William P. died in Windsor.

PHELPS, WILLIAM WALTER, LL.D.: statesman: b. New York, 1839, Aug. 24. He graduated from Yale 1860, and from the Columbia Law School 1863; settled at Englewood, N. J.; became counsel for several large corporations, and was offered, but declined, the position of judge. In 1869 he inherited a large fortune, and retired from the law to attend to his estate. He was prominent in the movement which secured for the alumni of Yale Univ. a share in the management of its affairs, and for many years was one of the trustees of the university. He was elected to congress as a republican 1872, became a prominent debater, voted against the Civil Rights Bill, and for the latter act was defeated for re-election. He opposed the third-term movement in favor of Gen. Grant, and he supported Blaine in three presidential conventions. He was minister to Austria 1881–2, member of congress 1883–89; in the spring of the latter year was appointed U. S. commissioner to the Samoan conference at Berlin; and June 26, soon after his return home, was appointed U. S. minister to Germany. He received the degree LL.D. from Rutgers College 1889. He died in Englewood, N. J., 1894, June 17.

PHENACETIN, n. *fĕ-năs'ĕ-tĭn* [from Gr. *phenol* and *acetin*]: a white crystalline coal-tar compound used in medicine as an antipyretic. Its use is not safe in unskilled hands.

PHENAKISTOSCOPE, n. *fĕn'ă-kĭs'tō-skōp* [Gr. *phenakis'tĭkos*, deceptive; *phenakizō*, I cheat—from *phenax*, an impostor; *skopĕō*, I view]: a toy instrument for illustrating the persistence of impressions on the retina.

PHENIC ACID, *fē'nĭk* [Gr. *phainō*, I show]: carbolic acid; the hydrated oxide of phenyl; a powerful antiseptic, consisting of colorless crystals obtained from salicylic acid or coal-tar: see CARBOLIC ACID. PHENOL, n. *fē'nōl*, same meaning as *phenic acid*. PHENYL, n. *fē'nĭl* [Gr. *phainō*, I show; *hulē*, material], (C_6H_5): radical of phenol or Carbolic Acid (q.v.). To the large and important P. group of compounds belong phenylamine, or Aniline (q.v.), and Trinitrophenic or Picric Acid (q.v.).

PHENICIA, ETC.: see PHŒNICIA, ETC.

PHENICINE, n. *fĕn'ĭ-sĭn* [Gr. *phoinix*, purple-red: F. *phênicine*]: indigo-purple or carmine, a powder precipitated by water from a solution of indigo and sulphuric acid.

PHENIX, *fē'nĭks:* city, cap. of Maricopa co., and of the territory of Arizona; on the Maricopa and Phœnix railroad, and on the Salt river, 35 m. n. from Maricopa, where connection is made with the great Southern Pacific railroad system. The city occupies the site of a prehistoric village, and from this fact derives its name. Several religious organizations have churches, there are good public schools, and two collegiate schools; the Masons and Odd Fellows each have flourishing lodges and fine buildings; there are two daily and three weekly newspapers, one of the latter in Spanish; and five banking institutions. The streets are regularly laid out, many shade-trees have been planted, there are street railroads, water-works, and an excellent fire department, and light is furnished by gas and electricity. There is an active chamber of commerce and a large trade with the surrounding agricultural and mining region. P. was laid out 1870, became the co. seat the following year, and the cap. of the territory 1889. Pop. (1880) 1,708; (1890) 3,152; (1900) 5,544.

PHENIX, n., or PHŒNIX, n. *fē'nĭks* [L. *phœnix*—from Gr. *phoinix*, a fabulous Arabian bird]: in *anc. myth.*, a bird said to have been able to rise again from its own ashes—used as an emblem of immortality: see PHŒNIX.

PHENIXVILLE, *fē'nĭks-vĭl:* borough in Chester co., Penn.; on the Philadelphia and Reading and the Pennsylvania railroads, and on the Schuylkill river, 28 m. n.w. from Philadelphia. There are 10 churches; a seminary and good schools; one daily and two weekly newspapers; and two national banks (cap. $350,000). The streets are lighted with gas; there is a system of water-works, an organized fire dept., and a public park. About 2,400 men are employed in the iron and steel works of the Phœnix Iron Co. and the Phœnix Bridge Co.; and there are extensive manufactures of shirts, stockings, silk, needles, pottery, and machinery. The iron-works are lighted by electricity. Articles of incorporation were secured by P. 1849. Pop. (1880) 6,682; (1890) 8,514; (1900) 9,196.

PHENOGAMIAN, a. *fĕn′ō-gā′mĭ-ăn*, or Phen′ogam′ic, a. *-găm′ĭk*, or Phenogamous, a. *fĕ-nŏg′ă-mŭs* [Gr. *phainō*, I show ; *gamos*, marriage]: same as Phanerogamian, etc., which see. Phenogams, n. plu. *fē′nō-gămz*, plants which have conspicuous flowers ; phanerogams.

PHENOL : see under Phenic Acid.

PHENOMENON, n. *fĕ-nŏm′ĕ-nŏn*, Phenom′ena, n. plu. *-ĕ-nă* [L. *phœnom′ĕnon ;* Gr. *phainom′ĕna*, appearances—from Gr. *phaï′nŏmai*, I appear : It. *fenomenon ;* F. *phénomène*, a phenomenon] : an appearance of nature, the cause of which is not immediately obvious : thence, an unusual appearance ; something exceedingly rare ; a prodigy. In philosophy, a P. is an object or fact as it is perceived by us, as distinguished from what it is in itself. In the philosophy of Kant, that, whatever it may be, which is behind the phenomenon, and causes it, is called the *noumenon*, as being merely assumed or thought of in the mind. See Metaphysics : Perception. Phenomenal, a. *fĕ-nŏm′ĕ-năl*, pertaining to or consisting of phenomena. Phenom′enalism, in philosophy, the doctrine that phenomena are the only realities ; or, in another phase, that all things that are seen by man are mere appearances and not realities : this philosophy is based on the same principles as the idealistic philosophy of Berkeley and Hume (see Perception : Idea). Phenom′enism, n. *-īzm*, same as phenomenalism. Phenom′enally, ad. *-năl-lĭ*. Phenom′enol′ogy, n. *-nŏl′ŏ-jĭ* [Gr. *logos*, discourse] : a history of phenomena, or a description of them.

PHENYL : see under Phenic Acid.

PHEON, n. *fē′ŏn* [probably OF.]: in *her.*, the barbed head of a dart; represented as engrailed on the inner side: its position is with the point downward, unless otherwise blazoned. It is used in Britain as a mark to denote crown property, and called Broad Arrow: see under Arrow.

PHERÆ, *fē′rē:* powerful city of Thessaly, near Mount Pelion; according to legend, the ancient royal seat of Admetus and Alcestis; afterward of political consequence under ‘ tyrants ’ of its own, who long made their influence felt in the affairs of Greece, and repeatedly attempted to make themselves masters of Thessaly. One of these, named Alexander, is particularly noted for his cruelties. It was one of his practices to bury innocent persons alive, and another to sew them up in the skins of wild beasts and set his hounds upon them. After a bloody reign of 13 years, he was slain by his wife and her brother, b.c. 357. Five years later, P., with the rest of Thessaly, became subject to Philip of Macedon.—At P. there was a mineral spring, named Hyperia, famous for its healing virtues. A few ruins at Velestino still mark the site of the city.

PHERECYDES, *fĕr-ē-sī′dēz*, of Syros: one of the most ancient Greek philosophers: b.c. 6th c.; b. in the island of Syros, one of the Cyclades. He is said by Diogenes Laertius to have been a rival of Thales, and to have learned his wisdom from the Egyptians and Chaldeans. He wrote a Cosmogony in a kind of prose resembling poetry, under the title *Heptamychos*, the meaning of which is doubtful, in which, in a manner rather poetic than philosophic, he endeavored to show the origin of all things from three eternal principles—*Time* or *Kronos; Earth*, as the formless and passive mass; and *Æther* or *Zeus*, as the formative principle. He taught the doctrine of the existence of the human soul after death; but it is uncertain if he held the doctrine of the transmigration of souls, afterward promulgated by his disciple, Pythagoras. Of his work, only fragments are extant, collected and elucidated by Sturz (Gera 1798; 2d ed., Leip. 1824).—Another P., of Athens, B.C. 5th c., compiled the mythical histories of Athens and other states; of which fragments remain (collected by C. Müller in *Fr. Hist. Gr.*, I.). **See Sturz, *Pherecydis Fragmenta* (Leip. 1824).**

PHIAL, n. *fī′ăl* [L. *phĭălă;* Gr. *phĭălē*, a shallow cup or bowl: It. *fiala:* F. *fiole:* OF. *phiole*]: a small glass bottle for holding liquors or medicines; a large glass vessel or bottle: V. to preserve or put in a phial. Phi′alling, imp. Fhi′alled, pp. *-ăld:* Adj. kept in a phial. *Note.*—*Vial* is not strictly synonymous with *phial*—the latter generally implies glass, especially small glass bottles for containing medicines and the like; the former may be composed of other materials, as alabaster, agate, etc. Skeat, however, says *phial* is the altered and more learned form of the old spellings *vial*, *viall*, and *viol*. Leyden-phial: see Leyden-jar.

PHIDIAS, *fĭd′ĭ-as* (Gr. *Pheidias*, *fī′dĭ-as*): greatest sculptor of ancient Greece: b. Athens, probably between B.C. 500 and 490; d. about B.C. 432; son of Charmides. His first instructor in art was Hegias of Athens; he studied afterward under a more famous master, Ageladas of Argos. He appears to have acquired distinction in his profession first soon after the battle of Salamis; indeed his great works were all executed during a period most favorable for the development and encouragement of genius, when Greece was triumphant over external enemies, and her people enjoyed fuller liberty than at almost any other period of their history. With the character of the age correspond the works of its poets, particularly of the tragedians Æschylus, Sophocles, and Euripides; and of its sculptors, particularly of Phidias. Under Cimon's administration the Athenians began the work of restoring their city, which the Persians had destroyed, to more than its former magnificence, and of filling it with noble works of art. P. was accordingly employed in making the colossal brazen statue of Minerva, *Athena Promachos*, which was placed upon the citadel, and executed probably about B.C. 460. To the govt. of Cimon succeeded that of Pericles, still more brilliant, and signalized by an extraordinary development of art. Pericles not only gave to P. a commission to execute all the more splendid statues that were to be erected, but made him general superintendent of all works of art going on in the city. Plutarch tells us that P. had under him architects, statuaries, workers in copper and bronze, stone-cutters, gold and ivory beaters, etc. To P., as director-general of all the skilled artists and artificers of Athens, we owe, among other glorious edifices, the Propylæa and the Parthenon, whose sculptured ornaments were executed under his direct superintendence; while the statue of the goddess Athene, whose materials were ivory and gold, was the work of P. himself (about B.C. 438). This statue was clothed with a golden robe, which alone was worth 44 talents of gold. The statue is gone forever, and the Parthenon is now only a magnificent ruin, but there remains splendid evidence of the genius of P., in the sculptures of the metopes, and friezes of the temple of Athene: see Elgin Marbles. In the next year P. went to Elis, where he executed a colossal statue of Zeus for the Olympeium at Olympia (q.v.), also of ivory and gold (about B.C. 433): this was reckoned his masterpiece. On his return to Athens, political passions were running high. There was a strong—at least a violent—party inimical to Pericles; but as they did not dare to attack the great statesman, they assailed him through his friends, P., Anaxagoras, Aspasia, etc. P. was accused of having appropriated to himself some portion of the gold intended for the robe of Athene. This accusation he repelled by taking off the robe and weighing it. He was then accused of impiety, for having introduced his own likeness and that of Pericles on the shield of the goddess. On this most frivolous and contemptible pretext he was thrown into prison, and died there, but whether of sickness or poison is uncertain. The works executed by or ascribed to P. were numerous, but those above mentioned are the most celebrated. Their prevailing characteristic appears to have been an ideal sublimity; and even the imperfect relics that remain are the most noble specimens of sculpture in the world.

PHIGALIAN MAR'BLES, *fi-gā'li-an:* sculptured frieze taken from the cella of the temple of Apollo Epicurius at Phigalia, an ancient town in Arcadia, and transferred 1814 to the British Museum. It represents the contests between the Centaurs and Lapithæ. The Phigalian temple of Apollo is, next to the Theseium at Athens, the most perfect architectural ruin in all Greece; but in its sequestered position at the head of a lonely and rocky glen, among the Arcadian hills, it long remained unknown in modern times, except to the shepherds of the district. Chandler first visited and described it 1765. The temple is of hard yellowish-brown limestone, stand n. and s., was originally about 125 ft. long and 48 broad and had 15 columns on each side, and 6 on each front, in all 42, of which 36 still remain. The marbles brought to London are the most exquisite remains of Greek art in Britain.

PHILADELPHIA, *fĭl-a-dĕl′fĭ-a:* city, coextensive with P. co., Penn.; on the Delaware and Schuylkill rivers, and on six important railroads; 85 m. s.w. of New York, 96 m. direct w. of the Atlantic Ocean, 125 m. direct n.e. of Washington; lat. of new public buildings 39° 57′ 7·5″ n., long. 75° 9′ 23·4″ w.; 129·4 sq. m.; rank (1900) 3d in area and in population. Of the total area, 108 sq. m. are between the two rivers and n. of their junction, and 21·4 are on the w. side of the Schuylkill. The Delaware river is navigable to the city for the largest ships; the Schuylkill for vessels of less size. The city has 5 m. of wharves on the Delaware river front, and 4 m. on the Schuylkill front; the Delaware channel here is 35–40 ft. deep at low water, the Schuylkill 18 ft. About 4 sq. m. in the s. portion of the city are below low tide and occupied by truck farms; one-fourth the area near the n. and w. boundaries is open farm-land; 50 sq. m. are suburban land undergoing improvement; and 40 sq. m. are urban territory, chiefly n. of the city hall. The surface slopes from 10 ft. above sea-level in the s. portion n.w. to 446 ft. at Chestnut Hill, and is underlaid by gneiss rock.

The city was originally laid out in parallelograms of about 4 acres each, with streets at right angles to each other. Market street is the dividing line between the n. and s. portions of the city; Broad street extends through the entire city, from League Island to the Montgomery co. boundary line. Market street is 100 ft. wide, Broad 113, Spring Garden 120, and other principal ones from 100 to 50. The houses are numbered by the decimal system, 100 to the block, even numbers on the s. and w. sides of streets, odd numbers on the n. and e. sides. In 1890 the total length of all streets and opened alleys was 1,151·6 m., of which 392·2 m. were paved with cobblestones, 98·2 m. with block-stones, 11·2 m. with brick, 96 m. macadam, 15·8 m. asphalt sheets, 18·3 m. asphalt blocks, and 117·6 m. with rubble. There were 367·9 m. of sewers, 66·59 m. of mains more than 3 ft. in diameter, 301·31 m. of branches 3 ft. and less in diameter. The system had 80 outlets, discharging principally into the Delaware river and into the Schuylkill below Fairmount dam, with bottoms of sewers generally below high tide. The sewerage plant had cost for construction $8,056,435 since 1855, and for maintenance and repairs about $25,000 annually. In 1903, Jan. 1, there were 1,546 m. of streets (1,126 paved). The cost of cleaning them (1902) was $720,890, and of lighting them $1,009,357.

The city is supplied with water from the Schuylkill (90 per cent.) and Delaware (10 per cent.) rivers, by pumping with water or steam power into reservoirs, pumping by steam-power into stand-pipes, and directly into distribution-pipes. The system had (1890) 9 reservoirs, with capacity of 891,491,454 gallons; full daily pumping capacity was 185,290,000 gallons; and average daily consumption 116,500,000 gallons. There were 930 m. of mains, 7,433 hydrants, 646 fountains, 343 watering troughs, and 12,246 valves. In 1902 there were 1,309 m. of mains and the average daily consumption was 279,975,453 gallons; cost of works $37,000,000.

The fire limits of city comprise the entire co. of P.; the fire dept. had (1890) 509 men, 40 steam-engines, 20 fire extinguishers, 2 chemical engines, 44 hose vehicles, 10 hook and ladder trucks, 73,000 ft. of hose, 180 horses, 900 m. of fire-alarm wire, and 550 alarm boxes. The average annual cost of the dept. 1880–90 was about $625,000. The police dept. had 1,717 men, 11 patrol wagons, co. prison, 26 station-houses, 10 sub-stations, and Gamewell electrical plant, and cost about $1,000,000 annually 1880-90. There were 1,471 licensed liquor and beer saloons, 268 wholesale, 1,203 retail; license fee each class $500, revenue $735,500.

There are 50 public parks in the city, aggregate area 3,505.93 acres. Of the acreage (1890) 373 were covered by water, 177.7 were given to the city. The original cost of park-lands acquired by purchase was $17,503,522, total cost of improvements $1,823,671, average annual cost of maintenance (1880–90) $260,100. The parks contained 32½ m. of driveways, 7·82 m. bridleways, and 40·77 m. footways. The principal park, the largest in the United States and one of the largest in the world, is named Fairmount, from Fairmount Hill on the Schuylkill river, on the summit of which are the four great reservoirs of the water-works system. It is a tract of great natural beauty, is pleasingly diversified in surface, and exhibits the highest order of landscape-gardening. It extends along both banks of the Schuylkill river more than 7 m., and along both banks of Wissahickon creek for more than 6 m.; is nearly 14 m. in extreme length; varies from ½ m. to 2 m. in width; and comprises 2,791½ acres. The Centennial Exhibition (q.v.) 1876 was held on a plot of 236 acres in Fairmount Park, at the head of Girard avenue. Of the 5 main exhibition buildings, Memorial Hall, erected jointly by the state and city for the fine-art display at a cost of $1,500,000, and Horticultural Hall, of stone, glass, and iron (cost $251,937), were designed for permanent use; and are now occupied by the Penn. Museum of Industrial Art and by the Conservatory respectively. The Main Exhibition Building was allowed to stand for several years, and was used for general exhibition purposes. The park contains also a grand zoological garden (1874), the first established by an American city; numerous minor buildings; Randolph Rogers's colossal bronze statue of Abraham Lincoln; several handsome bridges across the Schuylkill river; Lemon Hill; George's Hill; observatory; Sedgeley Hill; Belmont Glen; and countless objects to please and instruct.

The govt. is vested in a mayor, elected for 3 years, salary $12,000 per annum; a select council of 34 members, elected for 3 years, no salary; a common council of 110 members, elected for 2 years, no salary; city controller, $8,000 per annum; receiver of taxes, $10,000;

city treas., $10,000; city solicitor, $10,000; dist.atty., $10,000; 3 city commissioners, each $5,000; recorder of deeds, $10,000; sheriff, $15,000; register of wills, $5,000; coroner, $5,000; 12 judges, courts of common pleas and quarter sessions, each $7,000; 4 judges, orphans' court, each $7,000; 28 police magistrates, each $3,000; and 131 appointive officers, heads and chiefs of depts. and bureaus, aggregate salaries $90,300 per annum.

Finances and Banking.—The city debt (1889, Jan. 1) was $57,942,934; assets in securities $30,707,780, in real estate $42,964,344; excess of assets over liabilities $15,729,190. In 1897, Jan. 1, the total bonded debt was $54,023,120, outstanding warrants $1,031,810, total debt $55,854,930; sinking fund $19,575,350, leaving the net debt $35,479,580; besides the sinking fund the city had cash assets amounting to $8,296,590; real estate owned by the city $52,774,894; assessed real and personal valuation of taxable property $818,827,549. In 1903, Jan. 1, the net debt was $50,055,395; tax rate $18.50 per $1.000; annual cost of maintaining the city government, $30,113,147; assessed value of real estate, $917,208,060; of personal property $1,649,799. In 1902 P. had 35 national banks, with total loans and discounts outstanding $158,086,371; total capital stock, $21,405,000; total circulation, $9,245,583. There were 28 (1890) fire insurance companies (cap. of 19, $8,283,907, assets of all $37,442,567, and liabilities of all, excepting scrip, cap., and net surplus, $16,725,163. Of 5 life insurance cos., American Girard Life Ins. Annuity and Trust, Penn. Mutual, Presb. Ministers' Fund, and Provident Life and Trust, American, Girard and Provident reported cap. $2,000,000, the Girard ranking 2d as to age in U. S. Presb. Ministers' Fund, org. 1759, ranked 1st as to age in U. S.

Commerce.—P. constitutes one U. S. customs district and one U. S. internal revenue district. During the fiscal year ended 1903, June 30, the imports and exports were: Imports $59,995,431; exports $73,531,968; receipts of flour and grain, 38,008,306 bbls. In 1902, December, the tonnage of foreign vessels entering the port was 142,220; of American vessels, 10,640; exports of beef cattle numbered 28,643, value $2,861,390; value of breadstuffs $18,815,383; of provisions $17,242,064; coastwise shipments of coal 2,450,000 tons. (For U. S. naval constructions, see PENNSYLVANIA—*Ship-building.*) Commerce is facilitated by the Pennsylvania railroad system, comprising 7,521 m. of railroad and 392 m. of canals; Lehigh Valley railroad and its Morris and Essex canal; Reading railroad system; and the Baltimore and Ohio, P. Wilmington and Baltimore, N. Pennsylvania, Camden and Atlantic, W. Jersey, Westchester and P., and P. and Atlantic City railroads; and ocean steamship lines plying regularly between P. and Liverpool, Glasgow, New York, Boston, Savannah, Charleston, and other parts.

Manufactures.—P. had (1900) 15,887 manufacturing establishments, with $476,529,407 capital, of which $64,859,709 represented buildings; average number of employes 246,445, of whom 18,062 were members of firms, officers and clerks, 172,011 men 16 years and over, 12,746 children; total wages $111,847,076; materials used $326,877,441, including $6,193,301 for fuel and rent of power and heat; products $603,466,526. P. contains the largest locomotive works—and manufactures one-third of all the locomotives made—in the United States.

The capital invested in foundry and machine shop products is nearly double that invested in any other industry, and exceeds $45,000,000. The two next important industries are the manufacture of brewery products, with $27,600,000 capital, and the refining of sugar and molasses, with $23,992,000.

The subjoined table gives the summaries for leading industries of the city.

Religion.—In 1890 there were nearly 1,000 churches, missions, and preaching places in P. The Meth. Episc. Church reported: Philadelphia Conference, districts of n., n.w., w., and s. P., 360 churches, 264 travelling and 335 local preachers, 63,096 members, 388 Sunday schools, 9,251 officers and teachers, 81,301 scholars, $4,835,389 value of church property, 145 parsonages, $536,525 value. The Prot. Episc. Church reported 95 churches and missions, 29,529 communicants, divinity school, acad., 6 hospitals, dispensary, 6 homes and nurseries, library assoc., and 9 workingmen's clubs. The Presb. Church in the U. S. of A. reported: presbyteries of P., P. n., and P. central, 120 churches, 182 ministers, 37,184 members, 159 Sunday schools, 4,401 officers and teachers, 48,255 scholars, and contributions for congregational purposes $591,707. The Rom. Cath. Church reported: archdiocese of P., 1 abp., 296 priests, 155 churches, 94 chapels and stations, 3 colleges, 13 religious orders of women, 1,240 religious women, novices, and postulants, 21 academies and select schools for young ladies, with 2,100 pupils, 77 parochial schools, with 27,432 pupils, 9 academies and parochial schools under the Christian Brothers, with 2,861 boy pupils, 10 orphan asylums, with 1,488 inmates, 4 hospitals, 2 homes for aged poor, industrial home for boys, industrial home for girls, protectory for girls, widows' asylum, and estimated Rom. Cath. pop. 400,000. The Baptists reported 79 churches, 100 ministers, 22,582 members, 89 Sunday schools, 2,202 officers and teachers, 21,718 scholars, church property valued at $2,381,700, and aggregate contributions $363,836. The Ref. Church in America reported: Classis of P., 14 churches, 16 ministers, 1,506 families, 2,928 members, 29 Sunday schools, 3,360 officers, teachers, and scholars, and $30,213 contributions for congregational purposes. Other congregations, associations, and religious societies were: Lutheran, all branches, 40; Hebrew 16; African Meth. 12; United Presb. 10; Ref. Episc. 9; Evang. Assoc. 8; Disciples 4; Meth. Episc. Zion African 4; Independent 4; Moravian 4; New Jerusalem 4; Dunkard 3; Independent Meth. 3; Meth. Prot. 3; Unit. 3; Free Meth. 2; Congl. 2; Univ. 2; Mennonite 2; Adventist 2; Bible Christians, Breth. in Christ, Christadelphian, and Church of God, 1 each; and miscellaneous 15. The oldest church structure in the city

LEADING MANUFACTURES OF THE CITY OF PHILADELPHIA.

Industries.	Establishments.	Capital.	Employees.	Wages.	Materials.	Products.
Bags, other than paper	3	$ 41,250	29	$ 10,425	$ 85,220	$ 130,208
Bookbinding and blank books	66	1,122,896	1,281	535,064	539,408	1,571,502
Boots and shoes, factory	63	2,658,489	3,782	1,574,054	3,360,157	5,931,045
Bottling	218	1,666,976	579	304,286	5.247.663	6,548,604
Brass casting and finishing	33	1.805,055	704	345,376	1,682,196	2,554,629
Bread and other bakery products	1,299	4,992,196	3,273	1,569,163	5.709,048	10,464,689
Brick and tile	37	2,448,668	1,451	678,201	283,085	1,497,304
Carpentering	731	5,048,534	4,337	2,747,800	5,059,009	21,751.145
Carpets and rugs	88	16,866,764	12,190	5,092,252	13,223,263	21,986 062
Carriages and wagons	133	2,126,386	1,400	746,395	607,331	1,960,779
Cars, construction and repairs	10	1,433,997	2,780	1,609.055	1,945,770	3,651,401
Chemicals	24	13.400,479	1,917	1,026,013	4,333,716	7,810,456
Clothing, men's. factory	397	8,141,180	6,463	3,301,070	9,629,915	18,802,637
Clothing, men's, custom	750	2,685,896	2,576	1,297,082	2,034,858	5.616,886
Clothing, women's factory	191	3,384,850	6,233	2,122,028	5,039,999	9,452,259
Coffee and spice roasting and grinding,	43	1,167,821	308	137,379	1,905.633	2,642,080
Confectionery	338	3,235,945	331	167,129	3,423,298	6,000,815
Cordage and twine	9	3,906,458	1,168	398,905	4,210.942	5,221,239
Cotton goods	122	12,541,083	9,334	3,573,536	8,249.823	15,723,654
Dyeing and finishing textiles	91	4.981,389	3,455	1,578.434	2,440,916	5.562,099
Fertilizers	6	2,330,918	443	218,943	1,755,111	2,375,750
Foundry and machine-shop products	370	45,935,567	19,643	11.176,259	18,551.390	38,372,971
Furnishing goods, men's	32	642,568	988	301,437	1,308.985	2,057,686
Furniture, factory products	77	3,102,995	2,391	1,240,940	1,912,327	4,416,703
Hats and caps (not wool)	66	489,147	772	291,414	607,296	1,364,100
Hosiery and knit goods	142	10,024,606	11,944	3,567,087	6,174,278	13,040,905

PHILADELPHIA.

Industries.	Establishments.	Capital.	Employees.	Wages.	Materials.	Products.
Iron and steel	8	$ 6,069.671	2,815	$ 1,866,572	$ 3,564,526	$ 7,208,948
Jewelry	9	679,287	402	183,493	244.478	647,559
Leather goods	19	827,001	1,168	360,868	782,922	1,768,894
Liquors, malt	59	27,636,289	1,791	1,229,248	2,876,982	12,606,551
Lumber, planing-mill products	37	2,670,749	1,605	807,418	1,678,773	3,200,142
Marble and stone work	78	2,126,726	1,028	652,395	801,179	1,937,349
Masonry, brick and stone	264	4,910,820	4,897	2,906,682	5,978,692	13,565,550
Painting and paper-hanging	851	1,899,017	3,295	1,986,790	1,396,793	5,168.258
Paints	30	7,531,243	1,071	502,925	3,180,684	5,923,930
Patent medicines and compounds	78	2,116,674	659	255,285	973,389	3,013,034
Paving and paving materials	63	3,227,092	3,111	1,522,765	1,909,337	4,868,975
Paper and wood pulp	7	2,671,431	933	388,617	1,511,057	2,635,749
Plumbing and steam and gasfitting	685	2,381,553	2,629	1,527,427	2,993,807	6,294,008
Printing and publishing, book and job	401	11,539,833	5,327	2,508,317	2,948,999	10,066,740
Printing and publishing, newspaper	209	11,011,212	3,397	2,111,009	3,640,590	13,076,840
Roofing and roofing materials	105	600,653	542	272,321	551,378	1,226,257
Shirts	60	2,124,862	2,829	915.523	1,937,564	3,979,408
Silk and silk goods	28	3,813,532	2,506	826,456	2,291,674	4,531,794
Slaughtering and meat packing, wholesale	22	1,417,002	353	198,110	4,317,472	5,128,823
Soap and candles	33	2,307,478	499	198,430	1,554,511	2,716,357
Stationery goods	4	11,300	20	5,200	13,607	47,000
Sugar and molasses refining	7	23,992,552	1,249	647,592	33,658,440	36,163,817
Tinsmithing, coppersmithing, sheet iron working	437	2,636,063	2,304	1,218,139	2,146,642	4,731,473
Tobacco, cigars and cigarettes	550	4,042,502	6,032	2,371,808	3,321,261	8,687,349
Umbrellas and canes	36	1,245,056	1,628	550,374	1,879,852	3,145,446
Woolen goods	93	12,874,265	9,438	3,622,765	11,751,088	18,340,012
Worsted goods	36	14,079,859	7,407	2,429,603	10,518,700	16,242,242

is the Swedes' Church, on Swanson street, near Christian, a brick building erected 1700 to replace one of logs built 1677. It is surrounded by a cemetery with gravestones as old as the building, and is still used regularly. The next oldest is Christ Church (Prot. Episc.), on Second street near Market, begun 1727, finished 1754. It stands on the site of the first Christ Church, erected 1695, has a steeple 196 ft. high, contains the oldest chime of bells in the United States and a set of communion plate presented by Queen Anne, and was restored to its old-time appearance 1882. The third oldest is St. Peter's Church (Prot. Episc.), on Third and Pine streets, begun 1758, finished 1761, with cemetery containing a monument to Com. Decatur. Other notable edifices are the Cathedral of SS. Peter and Paul (Rom. Cath.), Logan sq., at Eighteenth street, largest church in the city, with dome 210 ft. high, Corinthian columns on façade, and altar-piece by Brumidi; Central Congl. Church, Green and Eighteenth streets, Norman in style; West Arch Street Presb. Church, Roman-Corinthian in style; St. Andrew's Church (Prot. Episc.), Eighth street near Spruce, Grecian-Ionic; St. Stephen's Church (Prot. Episc.), Fourth street, Gothic; Arch Street Meth. Episc. Church, white marble; Lutheran Church, green serpentine, Gothic; Synagogue, Broad street near Green, Saracenic; and the Friends' Meeting House, on Arch and Fourth streets. Bethany Church (Presb.) has the largest Sunday school in the United States, averaging 110 teachers and 2,400 scholars, with 1,800 in average attendance. John Wanamaker, ex-U. S. postmaster-gen., was its supt. 1902.

Education.—In 1895 P. had 41,000 (estimated) children in private and parochial schools and 163,515 in the public schools making a total enrollment of 204,515. In the public schools the average daily attendance was 111,361 ; the aggregate days' attendance was 22,160,839, number school days actually taught 199. Teachers numbered 3,095 (152 males, 2,943 females), supervising officers 104 ; number of buildings used for school purposes 289, value $11,273,573, seating capacity 136,784. Receipts for the school year were, from the state $1,000,000, city taxes $2,563,497, total $3,563,497. In 1902 the pupils enrolled in public schools numbered 152,889; the annual cost of maintaining the schools was $4,223,271. P. had (1901) four public high schools, as follows: Central Manual Training High School, 453 students; Girls' High School, 1,669 students; North East Manual Training High School, 426 students; Commercial High School for Girls, 1,207 students. Private endowed academies, seminaries and other schools for secondary instruction numbered 18, of which 3 were Episcopal, 1 Lutheran, 2 Roman Catholic, 4 Friends and the rest nonsectarian.

For higher education there are three colleges and universities; University of Pennsylvania, La Salle College and Central High School; 5 theol. schools, including the Divinity School of the Protestant Episcopal Church and the Evangelical Lutheran Theol. Seminary; there are 2 law schools; of Temple College and the Univ. of Pennsylvania; the medical schools were: Jefferson Medical College, Medico--Chirurgical College, University of Pennsylvania Medical Department, the Woman's Medical College of Pennsylvania, Hahnemann Medical College, Philadelphia Polyclinic and College for Moderates, Philadelphia Post-Graduate School of Homeopathics. Among the other schools were: Philadelphia College of Pharmacy, Philadelphia Normal School for Girls, Peirce School (Commercial). Schools for defectives and delinquents were as follows: Pennsylvania Institution for the Deaf and Dumb, Home for Training in Speech of Deaf Children, Pennsylvania Institution for the Instruction of the Blind, House of Refuge (Reformatory); training schools for nurses in the city numbered 27 and were connected with the various hospitals and medical schools.

U. S. Mint.—P. has the principal mint of the U. S. govt., a gray granite building in the Italian renaissance style, cost $2,000,000, on the corner of 16th and Spring Garden streets. It contains the largest and valuable collection of coins and gold and silver medals in the United States; has the latest appliances for assaying, melting, refining, and coining; and is open to the public daily excepting Sundays from 9 A.M. till 12 M. During the fiscal year ended June 30, 1895, the deposits and purchases of the precious metals at the mint were, in value gold $21,346,980, silver (coinage value) $3,266,820, total $24,613,800. Minor coinage metal was received to the value of $48,634, weight 210,500 lbs. The quantity of metals operated on during the year was, gold 2,491,779 oz., silver 4,603,208 oz., minor coinage 4,008,656 oz.; coinage executed, gold 2,787,255 pieces, value $21,532,975; silver 6,084,044 pieces, value $1,793,870.35; minor coinage, 35,087,302 pieces, value $712,594.02; total 43,958,601 pieces, value $24,039,439.37.

Public Buildings.—The buildings owned wholly or in part by the city and used for municipal purposes are the City Hall, locally known as the New Public Buildings, of marble, on Penn square, or intersection of Broad and Market streets; Independence Hall, brick, Chestnut street; 6 court houses, brick, cost $1,400,000; jail, stone, $300,000; 26 police stations, stone and brick, $622,000; 24 engine-houses, stone and brick, $300,500; 5 markets, frame and iron, $187,500; hospital, stone, $1,525,000; house of correction, stone, $800,000; 6 public baths, brick and stone, $41,290; 211 school-houses, brick and stone, $7,594,288; 16 buildings connected with water plant, brick and stsone, $6,853,000; and 71 buildings connected with gas plant, brick and stone, $2,978,000. The city (1890) held in trust bldgs., also valued at $9,598,907, had sundry pieces of real estate, including wharves and landings, which made the total value $65,325,479. The buildings owned or occupied by the U. S. govt. are the new Post-office and Court-house (cost $8,000,000); Custom-house and Sub-Treasury; Naval Asylum; Naval Hospital; Appraisers' Building; Mint; Schuylkill (Gray's

Ferry Road) and Frankford (Tacony Road) Arsenals; and Navy-yard on League Island, in the Delaware river. The most notable building architecturally is the new City Hall, of marble and granite, begun 1871, cost (1901, June 31) $24,313,455, still unfinished (1903), est'd total cost $18,000,000. It covers, exclusive of its court-yard, nearly 4½ acres. The n. and s. fronts measure 470 ft., and the e. and w. fronts 486½ ft., in extreme length. The four fronts are similar in design, with an entrance pavilion 90 ft. wide, 185 ft. high, and having receding wings of 128 ft. elevation, in the centre of each. The fronts terminate at the corners with towers 51 ft. sq. and 145 ft. high. Archways 18 ft. wide and 36 ft. high, opening through each of the four central pavilions, constitute the principal entrances, and afford passages for pedestrians directly through the structure. In the centre of the group of buildings, which constitute a single harmonious edifice, is a court-yard 200 ft. sq., supplying light and air to the various apartments. From the n. side of this space rises a grand tower, 90 ft. sq. at base, falling off at each of the four stories, till it becomes, at the spring of the dome, an octagon 50 ft. in diameter. A colossal statue of William Penn has been placed on the summit of the dome, which gives the tower a total height of 537 ft. 4½ in., and makes it the highest in new Post-office, Masonic Temple, *Public Ledger*, *Record*, and *Times* newspaper buildings, Horticultural Hall, Univ. of Penn., Y. M. C. A. Hall, Acad. of Fine Arts, Union League Club, Merchants' Exchange, Acad. of Natural Sciences, Ridgway Library, and the Philadelphia, First National, Drexel, and Girard Banks, are among the strikingly attractive edifices of the city.

The most notable buildings historically, besides the Swedes' Church and Christ Church, are the old State-house, on Chestnut st., between 5th and 6th sts.; Carpenters' Hall, in rear of Chestnut street e. of 4th st.; the Penn. Hospital, on Spruce, Pine, 8th, and 9th sts.; and the U. S. Custom-house, which was built for the first U. S. Bank. The name Independence Hall is now usually given to the whole of the State-house building, though properly it applies only to the e. room on the lower floor, where the second congress sat when it adopted the Declaration of Independence. The building was begun 1731, occupied 1735, and contains precious memorials of the dawn of American independence. Carpenters' Hall was built 1770 by the Carpenters' Company, which still owns it; and was the place of meeting of the first continental congress 1774. The Penn. Hospital occupies an entire square and was begun 1755.

History.—For the early history of P., see PENNSYLVANIA—*History*. The first municipal govt. is generally supposed to have been the one organized under the charter given by William Penn 1701 and preserved in Independence Hall. Penn received the grant of territory from Charles II. 1681, Feb. 24; took personal possession

1682, Oct.; was deprived of his govt., which was annexed to the colony of New York, 1692; had it restored to him 1694, Aug.; and gave his people a city charter 1701, Oct. 25. In 1789 the legislature incorporated the city, and 1854 consolidated numerous outlying villages with it and made it coextensive with the co. of P. While the actual govt. of the city has been conducted under the Penn charter and the two legislative acts, with such modifications as circumstances from time to time made necessary, it is interesting historically to note that, contrary to the general belief, Penn's charter was not the first one provided for the govt. of the new city. The discovery of a prior one was made 1887 by E. P. Allison and Boies Penrose, while collecting material for their *History of the Municipal Government of Philadelphia from* 1681 *to* 1887. They found among the papers of Alexander Biddle, whose grandfather was Washington's quartermaster, a charter dated '20th day of the Third Month in the third year in the reign of William and Mary, Anno Domini 1691,' signed 'Thomas Lloyd, Deputy Governor,' and attested as having been recorded in the 'Office of Rolls and Public Registry at Philadelphia, on the 29th of the Third Month, 1691,' by David Lloyd, deputy master of the rolls. The charter created a govt., with Humphrey Morrey, mayor; John de Lavalle, recorder; David Lloyd, city clerk; Samuel Richardson, Griffith Owen, Anthony Morris, Robert Ewer, John Holmes, and Francis Rawle, Jr., aldermen; the 'present justices;' and a common council of 12 members. As no records of this early govt. have been found, it is believed they were lost, with those of the provincial council for the same year, during the revolutionary war.

The city was divided into 10 wards 1741, and remained so till the consolidating act 1854, when the number was increased to 34, as at present. The publication of Bradford's *American Weekly Mercury* was begun in P. 1719; the first continental congress assembled 1774, Sep. 5; the second 1775, May 10; and other congresses 1777, Mar. 4, and 1778, July 2; an observatory was erected in the State-house yard 1770 to observe the transit of Venus; the British occupied the city 1777, Sep. 26—1778, June; the convention to frame the federal constitution met 1787, May; steamboat navigation of the Delaware river began 1787; the seat of the federal govt. was here 1790–1800, and George Washington and John Adams were inaugurated pres. and vice-pres. (2d term), and John Adams and Thomas Jefferson pres. and vice-pres., in the State-house; and excepting the interval of the British occupation, the city was the cap. of the colony and state till 1799. The exports were (1793) $7,000,000, (1796) $17,500,000, (1800) $31,384,091. The first bank of the United States was established in P. 1791, the second 1816. The war with England virtually destroyed the foreign commerce of P. and kept general business at a low mark 1812–16. The city suffered severely from yellow fever 1793, 97, and 98; Asiatic cholera 1832; abolition riots

1834, 5, and 38; and 'Native American' riots 1844. During the civil war the city provided the Union armies with 80 regts. for various periods; the Union volunteer and the Cooper refreshment establishments gave free meals to more than 1,000,000 soldiers passing through the city on the way to the battle-field or home; and a fair to raise money for the use of the U. S. Sanitary Commission yielded $1,080,000. The Centennial Exhibition (q.v.) was held in Fairmount Park 1876, May 10—Nov. 10; the bi-centennial of the landing of William Penn was celebrated 1882; bi-centennial of the settlement of Germantown by the German colony under Pastorius 1884; and the centennial of the signing of the federal constitution in P. 1887, Sep. 17.

Population.—(1778) 21,767; (1790) 28,522; (1800) 41,220; (1810) 53,722; (1820) 63,802; (1830) 80,458; (1840) 93,665; (1850) 121,376; (1860) city and co. 565,529; (1870) 674,022; (1880) 846,984; (1890) 1,046,252; (1900) 1,293,697.

PHILADEL′PHIA, in Lydia: see ALA-SHEHR.

PHILADEL′PHIA, in Palestine: see AMMONITES.

PHILADELPHIAN, a. *fĭl′ă-dĕl′fĭ-ăn* [Gr. *philos*, loved; *adelphos*, a brother]: pertaining to the city Philadelphia: N. an inhabitant of.

PHILADELPHUS, *fĭl-a-dĕl′fŭs:* genus of shrubs of the order *Philadelphaceæ* (Syringas) formerly; but placed by Gray under *Saxifragaceæ*. It has a turbinate calyx; sepals and petals each 4–5; stamens 20–40; styles 3–5, united below, and as many capsular cells, with numerous small seeds on axile placentæ; leaves opposite; flowers solitary or cymose-clustered, sometimes axillary. The N. Amer. scentless southern species, P. *inodorus*, with pure white flowers, has a large-flowered variety, *grandiflorus*, often cultivated. The best known, *P. coronarius*, Mock Orange, sometimes Syringa, has fragrant flowers and is of foreign origin. One species occurs on the Himalayas at an altitude of 6,000—7,000 feet.

PHILÆ, *fī′lē:* famous island in the Nile, s. of Syene, beyond the s. frontier of Egypt; 24° 1′ 28″ n. lat.; about 550 m. in a straight line from the mouth of the Nile (much farther by the windings of the river). It was called by the Egyptians Menlak, the place of the Cataract; or *Menuab*, the Abaton or Sanctuary; and by the Copts, Pilak, or ‘Cataracts.’ It is a granite rock, about 1,000 ft. long, and about 500 ft. broad, on which is placed a suite of buildings, not of the most remote antiquity, but of great architectural beauty. The oldest, a hypæthral or roofless hall, was built in the reign of Nectanebus I., B.C. 377–357. A second mention of the same monarch occurs on the first propylon, where a door, constructed in his reign, has been incorporated into the constructions by a later Ptolemy. Both these are dedicated to the goddess Isis, who in P. was venerated as Athor or the Egyptian Venus. The principal remains consist of the great temple of Isis, erected by Ptolemy II., or Philadelphus, and continued by his successors, especially by Ptolemy III., or Euergetes, B.C. 247–222.

The temple consists of a shrine or sekos, a pronaos, an open portico, and two pylons or gateways. Both of the propylons were constructed by Ptolemy VII., or Philometer, and Lathyrus; but the first received an addition from Ptolemy IX., or Euergetes II., B.C. 145–141. On the second pylon, the monarch is represented slaying the hostile nations. The colonnade was erected principally by Tiberius. The charming little temple, the Mastabat el Pharaoun, or Pharaoh's Bed of the Arabs, was made in the reign of Trajan, A.D. 100. The temples are important particularly as containing the principal representations of the story of Osiris, his birth, bringing up, death, and embalmment by Isis. Commenced in the reign of Nectanebus I., and continued by the Ptolemies and Romans, the worship of Isis lingered here till A.D. 453, or 60 years later than the edict of Theodosius. After the subjection of the Blemmyes to the Nubian Christians, the temple was converted into a church, and the paintings daubed with mud; and A.D. 577 the bishop Theodorous changed the pronaos of the temple of Isis into the church of St. Stephen; and a Coptic church, at a later period, was built out of the ruins. The whole area of the ancient temple was about 435 ft. long by 135 broad, in the centre of the dromos. At the present day the island is uninhabited. It is a favorite resort of travellers ascending to Nubia, and is one of the best of the remaining ruined sites of ancient Egypt.

Pliny, N. H., v., c. 29; Servius, *Æneid*, v. 154; Jones and Goury, *Views on the Nile;* Wilkinson, *Modern Egypt*, II. 295–303; Brugsch, *Reiseberichte aus Ægypten*, 256; Lepsius, *Reise*, 262.

PHILANTHROPY, n. *fĭl-ăn′thrō-pĭ* [Gr. *philos*, loved; *anthrōpos*, a man]: love of mankind—as opposed to *misanthropy*, hatred of mankind; universal benevolence; goodwill toward the whole human race. In the history of German school education it has acquired a special meaning. The influence of Rousseau was not less great on education than on politics, and was as visible in the pedagogues of Germany and Switzerland as in the men of the French Revolution. It is to the brilliant and one-sided advocacy, by the author of *Emile*, of a return to nature in social life and in the training of the young, that Basedow owed his novel and enthusiastic educationalism. For a brief notice of the institution, opened under his auspices at Dessau 1774, and called *Philanthropin*, see BASEDOW, JOHANN BERNHARD. Other establishments of the same kind were founded in different parts of Germany, but the only one still existing is Salzmann's Institute at Schnepfenthal, in Gotha, opened 1784. PHILANTHROPIC, a. *fĭl′ăn-thrŏp′ĭk*, or PHIL′ANTHROP′ICAL, a. *-ĭ-kăl*, loving mankind; possessing general benevolence. PHIL′ANTHROP′ICALLY, ad. *-lĭ*. PHILANTHROPIST, n. *fĭl-ăn′thrō-pĭst*, one who loves and seeks opportunities of doing good to mankind.

PHILATELY, n. *fĭ-lăt′ĕ-lĭ* [etym. doubtful; said to be from Gr. *philos*, loving, and *ateleia*, freedom from tax; the second element may be *telos*, a tax, and, regarding the stamp as the symbol of a tax or toll paid, *philately*, a love of stamps]: collecting of postage-stamps, especially those of foreign issues, as objects of curiosity or study. PHILAT′ELIST, n. *-lĭst*, one versed in philately; one who collects postage-stamps for curiosity or study.

PHILATORY, n. *fĭl′ă-tėr-ĭ* [Gr. *philos*, loved, loving]: a transparent reliquary placed horizontally upon four feet, and used to exhibit bones of saints, etc.

PHILBRICK, *fil'brĭk*, JOHN DUDLEY, LL.D., D.C.L.: educator: 1818, May 27—1886, Feb. 2; b. Deerfield, N. H. He graduated at Dartmouth 1842; taught in the Roxbury Latin School 1842–44, Boston High School 1844–47; and 1847 founded the Quincy Grammar School, which became a model for a system. He became principal of the Connecticut Normal School 1852, state supt. of education (Conn.) 1853; and 1857–74 and 1876–78 he was supt. of schools in Boston. He was commissioner from Mass. to international educational exhibitions at Vienna, Philadelphia, and Paris; and at the latter was decorated chevalier of the Legion of Honor 1878. He received the degree LL.D. from Bates College 1872; D.C.L. from St. Andrews Univ., Scotland, 1879. Dr. P. died at Danvers, Mass. He edited the *Connecticut State School Journal* and the *Massachusetts Teacher;* published lectures on *School Government* and *Characteristics of the True Teacher*, and several school text-books.

PHILEMON, *fī-lē'mon:* abt. B.C. 360—B.C. 262; b. Soli in Cilicia: Greek comic poet. He became a resident of Athens at an early age and produced his first play abt. B.C. 330. P. was the first writer of the New Comedy in the order of time; in celebrity he was second only to Menander (q.v.), from whom in many dramatic competitions he carried away the palm of victory. He wrote about 90 plays, of which fragments only remain: these have been edited by Meineke, and pub. with the fragments of Menander (Berlin 1823) and in the same editor's *Fragmenta Comicorum Græcorum* (Berlin 1841); they have been edited also by Dindorf, and pub. in his ed. of Aristophanes (Paris 1838).

PHILE′MON, Epistle of Paul to: shortest of the four extant letters which the apostle wrote from Rome during his captivity. We either directly learn or legitimately infer, from its contents, that Philemon, who lived probably at Colossæ, was a man of wealth, head of a numerous household, and liberal to the poor. He had possessed a heathen slave, Onesimus, who had run away from him, after—it has been thought (verse 18)—robbing or defrauding him. Onesimus, however, coming to Rome, had been brought into contact with Paul, and converted to Christianity. At first the apostle thought to retain him as his personal attendant, for he was now, as he tells us (verse 9), 'Paul the aged;' but on further consideration, he resolved to send him back to his former master. The epistle is simply a brief letter, begging Philemon to pardon Onesimus, and to receive him 'not now as a servant, but above a servant, a brother beloved.' It evinces an exquisite tenderness and delicacy of feeling, with all that tact and subtlety of address by which Paul was wont to find his way into the innermost heart of men. The historical evidence of its authenticity is complete. Even Baur has remarked that modern criticism in assailing this particular book runs a greater risk of exposing itself to the imputation of an excessive distrust—a morbid sensibility to doubt and denial—than in questioning the claims of any other epistle ascribed to the apostle Paul.

PHILE′MON and BAUCIS, *baw′sĭs:* in anc. mythology, according to a classic myth finely poetized by Ovid in his *Metamorphoses*, a married pair, remarkable for mutual love. Jupiter and Mercury, wandering through Phrygia in human form, were refused hospitality by every one, till this aged pair took them in, washed their feet, and gave them such humble fare as they could provide. On going away, the gods took the pair with them to a neighboring mountain, looking from which they saw their village covered with a flood, but their own cottage changed into a splendid temple. Jupiter permitted them to make any request they chose, but they asked only to be servants of his temple, and that they might die at the same time. When, accordingly, they were seated at the door of the temple, being now of great age, they were changed, Philemon into an oak, and Baucis into a linden. They felt the change taking place, and, as long as the power remained with them, looked tenderly on one another.

PHILHARMONIC, a. *fĭl′hâr-mŏn′ĭk* [F. *philharmonique* —from Gr. *philos*, loving; Gr. and L. *harmŏnĭa*, harmony of sound]: loving harmony; designating a society whose members are lovers of music or harmony.

PHILHELLENIST, n. *fĭl-hĕl′lĕn-ĭst* [Gr. *philĕō*, I love; *Hellēnes*, the Greeks]: a lover or friend of the Greeks, as against the Turks. Philhellenic, a. *fĭl′hĕl-lĕn′ĭk*, pertaining to.

PHILIBEG: see Fillibeg.

PHILIDOR, *fĭl′ĭ-dor*, FRANÇOIS ANDRÉ DANICAN: great chess-player and writer, and musical composer: 1726, Sep. 7—1795, Aug. 24; b. Dreux, dept. of Eure-et-Loir, France; grandson of Michel Danican, who assumed the name of P. in addition to his family name of Danican, on account of his having equalled—as hautboyist to Louis XIII.—a celebrated player on the same instrument, named Filidori. His grandson, the famous P., studied music, and composed many comic operas, now forgotten. While residing in London—whither P. had fled on the outbreak of the revolution—1779, he set to music the 'Carmen Sæculare' of Horace; and this work is considered by many a masterpiece of musical art. P.'s modern reputation rests exclusively on his skill in the game of chess, whose principles he laid down with exceeding clearness. His passion for this game prompted him to visit Germany and Holland, where the most distinguished players, except those of Italy, were then found, in order to measure his strength with theirs. He visited England 1747, and there defeated Philip Stamma, the Arabian player, 8 games to 1 game, with 1 draw. From 1784 P. visited London annually, as guest of the Chess Club in St. James's st. He was one of the founders of the London Chess Club. In London 1777 he published *Analyse du Jeu des Echecs* (Analysis of the Game of Chess), which has passed through an immense number of editions in various languages. He was noted for fine play of pawns, developing in a surprising manner the capacities of those usually underrated figures on the board. Another principle, then unique, seems to lie at the root of all P.'s games—to maintain and support carefully the pieces in the centre of the board; and rather than deviate from this principle, he rejects the opportunity for an effective and advantageous move. This scheme of the game, though now regarded by masters as sound in general, is deemed, if too strictly adhered to, to lead to a style lacking brilliancy and sometimes lacking force. He practiced with success the playing of games (usually three in number) blindfold; but in this particular he has been far surpassed in recent times by Harrwitz, and more recently by Morphy and Paulsen. P. died in London.

PHILIP, *fĭl′ĭp*, II., King of Macedonia: father of Alexander the Great, and founder of the Macedonian empire (see MACEDONIA): B.C. 382–336 (reigned B.C. 359–336); b. at Pella; youngest son of Amyntas II. and Eurydice. At Thebes, whither he was taken as a hostage by Pelopidas, he spent part of his early life, employing his exile in studying the art of war, and the constitution and laws of the Greek states, as well as the literature and character of the people—pursuits which served him as admirable preparation when called to administer the government of the Macedonian kingdom. The assassination of his eldest brother, Alexander II., by Ptolemy Alorites, after a short reign of two years (B.C. 369–367), and the death of his second brother, Perdiccas III., in battle B.C. 360, placed him at the head of affairs in Macedonia B.C. 359, as guardian to his nephew Amyntas, still an infant. In a few months, P. made himself king, the rights of Amyntas being set aside by public interests that seemed imperative. Dangers soon beset him from without and from within. The Illyrians and other neighboring tribes assailed his kingdom on different sides; while two pretenders to the throne, urged on by the Athenians and Thracians, stirred up civil commotion. But foreign and domestic enemies soon disappeared before the decision, the energy, and the wise policy of the young king. Within a year he had secured the safety of his kingdom, and had gained for himself a dreaded name, though then only 24 years of age. Thenceforward his policy was one of aggression, and his every thought was directed to the extension of his empire and the spread of Macedonian influence. The Greek towns on the coast of Macedonia were the first objects of attack. After possessing himself of Amphipolis and Pydna, by means little consistent with the faith of treaties, he transferred to the Olynthians the city of Potidæa, which he had taken from the Athenians. In Thrace he captured the small town Crenides, which, under its new name, PHILIPPI (q.v.), soon acquired great wealth and fame, and ultimately became prominent in profane as well as in sacred history. The surrounding district was rich in gold mines, which brought great revenue to P. (probably about $1,200,000 annually), and supplied him plentifully with the means of paying his armies, of bribing traitorous Greeks, and of opening the gates of many cities, whose sieges might otherwise have cost the blood of thousands. Later he turned southward; and capturing Methone (in whose siege he lost an eye), he advanced into Thessaly, and ultimately to the Strait of Thermopylæ, which he did not attempt to force, as it was strongly guarded by the Athenians. Returning in to Macedonia, P. directed his arms against the Thracians, postponing his darling project to a more fitting occasion, which soon offered itself. After capturing all the towns of Chalcidice—the last the important city of Olynthus—he made peace with the Thracians, and next year with the Athenians, who had been at war with him in defense of their allies the Olynthians. It was this siege of Olynthus by P. which called forth the Olynthiac orations of Demosthenes, still admired as efforts of oratorical genius of the very highest order. P. was now requested by the Thebans to interfere in the war ('the Sacred War') between them and the Phocians. He marched into Phocis, destroyed its cities, and sent as colonists to Thrace many of the inhabitants B.C. 346. The place of the Phocians in the Amphictyonic Council (q.v.) was transferred to P., and he was appointed, jointly with the Thebans and Thessalians, president of the Pythian games. His next step was to secure a footing in the Peloponnese, by espousing the cause of the Argives, Messenians, and others, against the Spartans. B.C. 339 the Amphictyonic Council declared war against the Locrians of Amphissa; and, in the following year, appointed P. commander-in-chief of their forces. The Athenians were alarmed at his approach into Greece in this capacity, and formed a league with the Thebans against him; but their united army was utterly defeated at the battle of Chæroneia B.C. 338, and all Greece was at his feet. He was now in a position to enter on the great dream of his later years —to invade the Persian empire, and revenge the injuries of Greece. Deputies from the different states of Greece assembled in congress at Corinth; and after resolving to make war on the Persian king, chose P. as leader of their armies. Preparations were in progress for this great expedition when he was suddenly cut off by the hand of the assassin Pausanias, at a festival celebrating the marriage of his daughter with Alexander of Epirus. A private grudge at P., for neglect to punish an insult offered to Pausanias by Attalus, was said to be the motive of the murderer, though suspicion is not lacking that the deed was done at the instigation of Alexander and his mother Olympias, who had retired from the court in disgust at P.'s marriage the year previous with Cleopatra, daughter of Attalus, one of his generals. P. was a man self-indulgent and sensual; he was faithless in observance of treaty obligations, and unscrupulous in pursuing his ends; but he had to deal with factious and faithless opponents, which may help to explain, though not to justify, his policy; while his clemency as a victor has won the admiration even of the virtuous Cicero, who pronounces him 'always great.' His force of character, his acuteness, fertility of invention, and eloquence, can scarcely be overrated. He was a lover of learning and a liberal patron of learned men.

PHILIP III. (ARRHIDÆUS), King of Macedon: died B.C. 317 (reigned B.C. 323–317); son of Philip II. and Philinna of Larissa, one of his many wives. He succeeded Alexander the Great, being elected king by the army at Babylon, at the death of Alexander. He was a youth of weak understanding, totally unfit for the duties of government. His wife Eurydice (daughter of Amyntas, son of Perdiccas III.), whom he married B.C. 322, endeavored, on their return to Macedonia, to oppose the measures of Polysperchon and Olympias in support of the young Alexander, posthumous son of Alexander the Great and Roxana. But her army was defeated; she herself was taken prisoner, and, with her husband, was put to death.

PHILIP II., King of Spain: 1527, May 21—1598, Sep. 13 (reigned 1555–98); b. Valladolid; only son of Emperor Charles V. (q.v.) and Isabella of Portugal. He was brought up in Spain, and carefully educated under able tutors, becoming an accomplished linguist and mathematician, and a connoisseur in architecture and the fine arts. But all attempts to imbue him with the chivalric ideas of the time were futile. From his childhood he was distrustful and reserved; he invariably spoke with slowness and an air of deep reflection too marked to be genuine, and exhibited in his manners a *sang-froid* which even in his early years was rarely disturbed by ebullitions of passion. While still very young he was intrusted, under the direction of a council, with the government of Spain, and 1543 he espoused Mary of Portugal, who died three years afterward. In 1548 he went to join his father at Brussels, and there adopted and thenceforward retained the multitudinous equipage and minute and pompous etiquette of the late Burgundian court. While at Brussels, P. was presented to his future subjects, and was fully initiated into his father's policy, whose two chief items were maintenance and extension of absolute rule throughout his dominions, and support and propagation of the Rom. Cath. religion. In 1554 he married Mary Tudor, Queen of England, and to gain the support of that country to his political projects, and at the same time restore it to the Rom. Cath. pale, he laid aside his ordinarily cold and haughty demeanor, and labored to ingratiate himself with his wife's subjects, taking utmost care to avoid exciting their national jealousy of foreign influence. But his plans were discovered and frustrated; and this disappointment, combined with the annoyance to which he was subjected by the jealousy of his wife, prompted him to leave England (which he did forever), and return to Brussels 1555, Sep. In Oct. he became, by the abdication of his father, the most powerful potentate of Europe, having under his sway Spain, the Two Sicilies, the Milanese, the Low Countries, Franche Comté, Mexico, and Peru; his European territories being more fertile, and their inhabitants more wealthy and prosperous, than any others on the continent, while his army was the best disciplined, and headed by the greatest generals of the age. The treasury alone was deficient, drained by the enormous expenditure of his father's wars. P. was eager to begin the crusade in favor of Roman Catholicism; but he was compelled to postpone it by a league formed between France, the pope, and the sultan, to deprive him of his Italian dominions. He soon overcame his religious scruples at engaging in warfare with the pope, and intrusted the defense of the Sicilies to Alva (q.v.), who speedily drove out the pope and the French, and conquered the papal territories; while P. himself vigorously prosecuted the war against France in the north, and defeated the French at St. Quentin (q.v.), 1557, Aug. 10, and at Gravelines, 1558, July 13. These reverses forced the French (the pope having already made a separate treaty) to agree to terms of peace at Château-Cambrésis, 1559, Apr. 2. P.'s wife, Queen Mary of England, was now dead; and after an unsuccessful attempt to obtain the hand of her successor, Queen Elizabeth, he espoused Isabella of France, and returned to Spain, where from this time he always resided. Before leaving the Low Countries, he solemnly promised to withdraw almost the whole of his Spanish troops who preyed on the peaceful Flemings, but he firmly refused to annul or modify the rigorous edicts of his father against heretics. His realm being now at peace, he resolved, as a necessary preliminary to his great proselytizing scheme, to replenish his treasury; a thing impossible without forced contributions, which at that time could be obtained only in those countries over which he held absolute rule—Spain and America. He therefore set about establishing absolute government in those of his states that were in possession of something like free institutions, and with this view sought to introduce the Inquisition into the Low Countries and Italy. But the introduction of this instrument of tyranny was successfully resisted in Naples and the Milanese; in Sicily its powers were so shackled as to render it harmless; but these failures only stimulated him the more to establish it in all its pride and power in the Low Countries. For a number of years it continued in vigorous action in that country; but the natural result was a formidable rebellion of all classes, Rom. Cath. and Prot., which was partially successful—the n. portion (the 'seven united provinces') establishing its independence 1579. In this conflict the resources of Spain were largely expended, and to replenish his treasury in the speediest manner possible, P. exacted enormous contributions from Spain, abolishing all special communal or provincial privileges and rights which might interfere with his actions, and suppressing all insurrection and discontent by force of arms or the Inquisition. During the first half of his reign he engaged in desultory warfare with the Barbary corsairs, who were supported by the Turks—the only memorable incident of which was the famous naval victory of Lepanto (q.v.), 1571, Sep. 16. In 1580, the direct male line of Portugal having become extinct, P. laid claim to the throne; and after the Duke of Alva had occupied the kingdom with an army, the Spanish monarch's title was recognized by the Portuguese estates. His enmity to England on account of the anti-Spanish policy of Queen Elizabeth incited him to attempt the conquest of that country, but his most formidable attempt failed signally: see ARMADA. After the accession of Catharine de' Medici to power, France and Spain drew closer the bonds of amity which had previously subsisted between the two countries; but the refusal of Catharine to adopt P.'s plans for the wholesale slaughter of heretics produced a coolness in their relations. However, when Henry, King of Navarre, a Huguenot, became heir-presumptive to the throne, P. allied himself with the Guises and the other chiefs of the Rom. Cath. party who were in rebellion, and his obstinate persistence in these intrigues, after the cause of the Guises was shown to be hopeless, prompted Henry to declare war against him. The Spaniards had the worst of it, and P. was glad to conclude the treaty of Vervins, 1598, May 2. He died in the Escurial at Madrid, in the same year. It cannot be denied that P. was gifted with abilities; but he was a visionary, especially in politics, and engaged in so many grand enterprises at once as to overtask his resources without any profitable result. The Escurial (q.v.), which he built, is in its gloomy grandeur and its uselessness a monument to his character. He had industry, patience, persistency; but utterly lacked sagacity and political insight. No single kingdom in Europe could have long stood against him; but he was always at war with at least two at a time; and even the splendid opportunity which the extinction of the direct Capetian line 1589 gave him for uniting France, Spain, and Portugal in one great monarchy, could not restrain this unfortunate peculiarity. His fanatical enthusiasm for Rom. Catholicism, in which he was surpassed by no man who ever lived, and the zeal with which he persecuted all heretics through the Inquisition, combined with the odious tyranny of his secular government to degrade Spain, by breaking the proud and chivalrous spirit which had been the source of its pre-eminence among European nations; while his virulent persecutions of the industrious Moriscoes, and his oppressive exactions, put a stop to the commerce of the country. His whole economic policy was disastrous. By his fourth wife, Anne of Austria, he had a son, Philip III.

PHILIP V., King of Spain, founder of the Bourbon dynasty in that country: 1683, Dec. 19—1746, July 9 (reigned 1701–46); b. Versailles, France; second son of the Dauphin Louis (son of Louis XIV.) of France. The last king of Spain of the Hapsburg dynasty, Charles II., had successively promised the succession to the throne to Charles, archduke of Austria, great-grandson of Philip III. of Spain, and to P., then Duke of Anjou, son of the eldest sister of Charles II.; but becoming cognizant of a secret treaty which had been agreed to between England, France, and Holland for the partition of Spain, Charles II., to prevent the dismemberment of his kingdom, left by will the succession to P. of Anjou. France immediately seceded from the partition treaty, and, on the death of Charles II. 1700, P., who was the favorite candidate among the Spaniards, except those in the e. provinces, took possession of the kingdom 1701, Apr. 21; and, to gain over Savoy to his side and thus create a diversion in Italy against Austria, he married Maria Louisa, daughter of Victor Amadeus. War almost immediately broke out between the rival claimants, Archduke Charles being supported by the 'grand alliance,' which included England, Austria, and Holland, and subsequently (1702, Jan.) Prussia, Denmark, and Hanover (1703, May), Portugal, and (1703, Oct.) Savoy: see SUCCESSION, WAR OF THE SPANISH. The fortune of war was mostly on the side of the allies; but France and Spain carried on the contest heroically, and, though at great sacrifices, the throne was secured to P. by the peace of Utrecht, 1713, Apr. 11. In the following year the queen died; and P. espoused Elizabeth Farnese of Parma, who immediately induced her husband to commit the reins of government to Alberoni (q.v.); in fact, so much was the weak-minded king under the influence of his able and energetic young wife, that he granted everything that she asked. 'He was,' says Sismondi, 'remarkable for good-nature, he had few faults and as few virtues, his sentiments were just and honorable, but he was wholly deficient in energy; he had no taste for anything beyond devotional exercises and the chase; he was made to be governed, and he was so all his life.' Alberoni's adventurous foreign policy, which at first succeeded in restoring the Spanish rule in Sicily and Sardinia, brought upon Spain the wrath of the Quadruple Alliance (France, England, Holland, and Austria), and war was averted only by Alberoni's dismissal; but his dismissal was produced really by his neglecting to further the queen's pet scheme of providing sovereignties in Italy for her sons, who seemed to have little chance of obtaining the throne of Spain. The strong bond of union which had hitherto subsisted between Spain and France was broken 1725 by the refusal of the regent of France to fulfil certain matrimonial agreements; but four years afterward the two countries joined with England and Holland against the emperor; and 1731 P. took measures to recover the old Spanish possessions in Italy. The war which followed at last satisfied the queen by giving the kingdom of the Two Sicilies to her son Charles (1736), but P., in attempting to obtain still greater advantages over Austria, was led into a war whose result he was destined not to see. He died at Madrid.

PHIL'IP, Apostle of the Lord Jesus: one of the twelve, mentioned fifth in the synoptical lists, and coupled with Bartholomew. Little is known of him except the few brief notices in the Gospels. He was of Bethsaida in Galilee, the city of Andrew and Peter. The Lord Jesus, the second day after his baptism, found Philip, and said to him, Follow me; Philip then found Nathanael (supposed the same as Bartholomew), and said, We have found him, of whom Moses in the law and the prophets, did write, Jesus of Nazareth. In reply to Nathanael's skepticism, Philip wisely answered, Come and see. It is fair to suppose that these two, and Peter and John, were, like Andrew, followers of John Baptist.

and were prepared to accept the Messiah. Subsequently, at the feeding of the five thousand, the Lord seemed to test Philip's faith (Jn. vi. 5–7), but the question and answer do not necessarily imply lack of faith in the disciple. Neither is there any certain revelation of character in the incident touching the Hellenist proselytes (Jn. xii. 20–22). The rudimentary spiritual conceptions of the disciples before the resurrection, are shown in Philip's words at the Last supper: Lord, shew us the Father, and it sufficeth us. After the resurrection, he is mentioned as present at the election of Matthias to take the place or Judas. Eusebius distinguishes between Philip the apostle and Philip the evangelist, and attributes the conversion of the eunuch (Acts viii.) to the former. But other Christian Fathers do not so distinguish; hence the traditions of the after life of the apostle at Hierapolis in Phrygia and his burial there, remain unconfirmed. The *Acta Philippi* are fantastic and apocryphal. As a saint, Philip's day, with that of St. James the Less, is May 1; in the eastern church, Nov. 14.

PHILIP, *fĭl'ĭp*, KING, Sachem of Pokanoket: d. 1676, Aug. 12; son of Massasoit, the sachem of Pokanoket, who ruled over territory from Narragansett to Massachusetts. Massasoit kept peace with the English colonists till his death. He took his two eldest sons to Boston to have them given English names; the court called them Alexander and Philip. Alexander succeeded his father; and after two years, while being taken in custody to Boston, died, it was suspected by poison treacherously administered by the English. P. proved himself brave and able, and not without generosity. His principal village was at Mount Hope, a conical hill 300. ft. high, near Bristol, R. I. He was suspected of treachery by the English; and by 1670 he was convinced that the only chance of success against them was in Indian confederation. He gathered round him 8,000 to 10,000 warriors. In 1671 he was summoned to appear at Taunton, Mass., and went with 75 warriors. He professed submission, and consented to deliver up the muskets and ammunition of his tribe. In 1673 a Christian Indian, called Sausamon, fled to P. for protection; but returning after a time to the English, told them that P. was preparing for war. For this treachery Sausamon was waylaid and slain, and the English in revenge hanged three Indians. P. then (1675) sent his women and children to the Narragansetts for protection, and after warning some settlers with whom he was friendly, went on the war-path, and the infant colonies had to engage in the terrific struggle known as King Philip's war. 1675, June 24, he burned Swansea, but soon retreated before the rallied colonists. Gov. Winslow invaded the Narragansetts, and extorted a promise of neutrality. P. wasted the country and massacred the settlers from the Connecticut valley n. through Springfield, Mass., to Vermont. Brookfield, Deerfield, and Hadley were burned or surprised; though at Hadley the Indians were repulsed by the colonists under the aged regicide William Goffe. No quarter was given or taken. Gov. Winslow 1675, Dec. 19, attacked the camp of the Narragansetts near Kingston, R. I., burned 500 wigwams, destroyed all their stores of winter provisions, and slew 600 warriors, and over 1,000 women and children. In the spring of 1676, P. retaliated by burning Weymouth, Groton, Medfield, Lancaster, Marlborough, in Mass., and Warwick and Providence, R. I. Philip's forces then dwindled, his wife and child were captured and sold into slavery, and he himself was shot in a midnight attack on his camp 1676, Aug. 12. His head was gibbeted at Plymouth, and his body quartered. The result of the war was the slaughter of over 600 colonists, and the almost complete extermination of the Wampanoag and Narragansett Indians.

PHIL'IP, THE MAGNANIMOUS, Landgrave of Hesse: 1504–67; b. Marburg. His father, William II. died 1509; and Philip succeeded him, his mother ruling as regent during her son's minority. In 1523 Philip married a daughter of George (nicknamed the Bearded), Duke of Saxony; and by her had four sons, who succeeded him in the landgraviate, it being by their father's will partitioned among them. Philip was among the first of the sovereign princes to cast in his lot with the Prot. Reformation, and as a member of the Smalkald League was defeated and taken prisoner by Emperor Charles V. 1546 at the battle of Mühlberg. His son-in-law, Maurice of Saxony, demanded, and obtained, his release after a brief captivity. It is a curious instance of how morality can be warped by religious prejudice that both the great Reformers Luther and Melanchthon allowed Philip's secret marriage to Margaret von der Saale, a Protestant, while his wife was still living—pronouncing the marriage with a Rom. Catholic adulterous.

PHILIPPE, *fe-lēp'*, II. (PHILIPPE AUGUSTE), King of France: 1165, Aug.—1223, July 14 (reigned 1180–1223); son of Louis VII. and Alix of Champagne. He was crowned 1179 during the life of his father, succeeded him 1180—being then again crowned, with his newly wedded wife; and proved one of the greatest monarchs of the Capetian dynasty. His marriage with Isabella of Hainault, descendant of the Carlovingians, established more fully the right of his family to the throne of France. He first made war on the Count of Flanders, to obtain the districts of Vermandois, Valois, Amienois, and Artois, which belonged to his wife; and, after various fortune, obtained Amienois and part of Vermandois at once, and the rest after the count's death 1185. By the advice of St. Bernard (q.v.) he rigorously punished heretics, despoiled the Jews, absolving their debtors of all obligations, excepting one-fifth, which he transferred to himself; put down with vigor the numerous bands of brigands and priest-haters who devastated the country and burned the churches and monasteries, compelling their chief leader, the Duke of Burgundy, to submit (1186) to his authority—acts which gave him great popularity among his subjects. He sustained the sons of Henry II. of England in their rebellions against their father, and conquered, in conjunction with Richard Cœur-de-Lion, many of the English possessions in France. After the accession (1282) of Richard to the throne, P. and he set out together on the third crusade; but quarrelled while wintering in Sicily; and this dissension continuing, P., after a sojurn of 3½ months in Syria, set out 1190, July 31, on his return to France, after taking a solemn oath to respect the integrity of Richard's dominions; but no sooner had he returned than he entered into an arrangement for the partition of Richard's territories in France with his unworthy brother John. Some acquisitions were made, but Richard's sudden return interfered with the calculations of the conspirators; and a war immediately commenced between the two monarchs, in which P. had to defend his territories at the same time from the English, and from the Counts of Champagne, Boulogne, Bretagne, and Hainault, who attacked them on all sides. To obtain money, he was obliged to rescind his edicts against the Jews; but the mediation of Pope Innocent put an end 1199, Jan. 13, to a war productive of no other result than exhaustion of the combatants. Richard of England died within two months; but war almost immediately recommenced with England, regarding the respective claims of King John of England and of his nephew Arthur of Bretagne to the French heritage of Richard Cœur-de-Lion, which consisted chiefly of Anjou, Maine, and Touraine. Arthur had applied to P. for aid, and the French king immediately responded by causing the young duke to be recognized in the above mentioned provinces; but a quarrel in which he became involved with the pope on account of his having divorced his second wife, Ingelburga of Denmark, to marry Agnes of Meran, a Tyrolese princess, compelled him to leave the English in possession a little time longer. The defeat, capture, and subsequent murder of Arthur, however, again brought P. into the field. The English provinces in France were attacked by the combined French and Bretons; Normandy and Poitou, with the three disputed provinces, were annexed to France; and the English dynasty in Bretagne dispossessed by a French one 1206, Oct. 26. 1211–14 P. was engaged in a war with King John of England and Emperor Otho of Germany, who had leagued themselves against him, in which he was on the whole successful. During the rest of his reign, P. was occupied in cosolidating his new possessions, and took no part either in the war with the Albigenses or that in England, though his son Louis (q.v.) went to England with an army. P. succeeded in establishing the unity of his dominions, and in emancipating the royal authority from the trammels of the papacy and clergy, and vindicated his sovereign authority over the clergy as his subjects, irrespective of the pope. His measures, without alienating the great feudal lords, tended firmly to establish his authority over them, and to emancipate the larger towns from their sway. To increase the unity of the kingdom, and strengthen the central power, he established at Paris a chamber of 12 peers, six lay and six ecclesiastical, who almost always supported his plans, even against the court of Rome. Moreover he largely improved and embellished Paris, built many churches and other institutions, and encouraged commercial associations; he also fortified many of the chief towns, including the capital. He died at Mantes.

PHILIPPE IV. (PHILIPPE LE BEL, *lĕh bĕl*, or 'the Fair'), King of France: 1268–1314, Nov. 29 (reigned 1285–1314); b. Fontainebleau; son and successor of Philippe III., King of France, and Isabella of Aragon. By his marriage with Queen Joanna of Navarre, he obtained Navarre, Champagne, and Brie. For several years he contested with the Count of Flanders the possession of that country; and he seized Guienne from the English; but was, in the end, obliged to restore Guienne and Flanders beyond the Lys. The great events of P.'s reign were his war with the papacy and the extermination of the Knights Templars; the former had its origin in the attempt of the king to tax the clergy as well as the laity for the heavy expenses of his numerous wars. Boniface forbade the clergy to submit to taxation; while P., on his side, ordered that neither money nor valuables were to be exported, thus cutting off a main supply of papal revenue; and on the pope's legate insolently reprimanding him, he threw the legate into prison. P. then called an assembly of states, in which deputies of towns appeared—not for the first time; and obtained assurance of their support, even in case of excommunication and interdict. Boniface in turn assembled a council at Rome (1302), which supported his view, and the celebrated bull, *Unam Sanctam*, was promulgated. P. caused the bull to be publicly burned, and with the consent of the states-general confiscated the property of those prelates who had sided with the pope. Boniface now excommunicated him; but the king, nothing daunted, sent to Rome his gen., William de Nogaret, who seized and imprisoned the pope, who, though released after a few days by a popular rising, soon afterward died of grief and mortification. In 1304 P. obtained the elevation of one of his own creatures to the papal chair as Clement V., on condition of his residing at Avignon, and giving up the Knights Templars (q.v.). In accordance with this agreement, the Templars—against whom popular prejudice had been aroused by fanciful charges of horrible crimes—were seized (1306–14), and burned by hundreds, and their wealth appropriated by Philip. The grand master, Jacques de Molay, was burned 1314, Mar. 18; and when dying he summoned P. to appear with him within a year and a day, and the pope within 40 days, before the judgment-seat of God: strange was it that both the pope and king died within the time mentioned, the king at Fontainebleau, from a hunting accident. P. during his whole reign steadily strove for suppression of feudalism and the introduction of the Roman law; but while thus increasing the power of the crown, and that of the third estate, his energy converted royalty, which had been protecting, kind, and popular to the mass of the people, into a hard, avaricious, and pitiless task-master. Under him the taxes were greatly increased, the Jews persecuted, and their property confiscated; and when these means were insufficient to satisfy P.'s avarice, he caused the coinage to be greatly debased.

PHILIPPE VI., OF VALOIS, King of France: 1293–1350, Aug. 22 (reigned 1328–1350); son of Charles of Valois, who was younger brother of Philippe IV. He succeeded to the regency of France on the death of Charles IV., the proclamation of a king being deferred on account of the pregnancy of Charles IV.'s widow; but on her giving birth to a daughter, P., according to a decision of the peers and notables, caused himself to be crowned king at Rheims 1328, May 29. His right to the throne was denied by Edward III. of England, grandson of Philippe IV., who declared that females, though themselves excluded by the Salic law, could transmit their rights to their children; and therefore insisted on the superiority of his own claim. P., however, was not only already crowned king, but he had the support of the people. His reign began gloriously; for marching into Flanders to support the count against his rebellious subjects, he wiped out the disgrace of Courtrai by vanquishing the Flemings at Cassel, 1328, Aug. 23. He was obliged to give up Navarre (q.v.), as the Salic law of succession did not apply to it, but he retained Champagne and Brie, paying for them a considerable annual stipend. P. seems to have had no settled plan of government, and no systematic political action; his acts were according to the whim of the hour, and were calculated mostly to gratify his own vanity and love of show. 1330–36, constant encroachments had been made on the English possessions in France, till at last Edward III.'s patience was exhausted; and, 1337, Aug. 21, he formally declared war. The commencement of this terrible hundred years' contest was made both in Guienne and Flanders; it was carried on languidly several years, the only prominent incident being the destruction of the French fleet off Sluys, 1340, June 24. In 1343, Mar., P. established the 'gabelle,' or monopoly of salt, a heavy percentage tax on all mercantile transactions. The constant round of fêtes and tournaments at court was never interrupted, even when the war had nearly exhausted the wealth of the country, for the money for them was immediately provided by some new tax or fresh confiscation. In 1346 Edward III. landed in Normandy, ravaged the whole country to the environs of Paris, and totally defeated P. at Crécy (q.v). A truce was then concluded; but the unfortunate king.

dom had no sooner been released from war, than destruction in another and a more terrible form, that of the 'Black Death' (q.v.), threatened it. The wild extravagance of the court was nothing lessened by this visitation; but the financial embarrassments in which P. found himself, compelled him to agree to the passing of a law (1338) which gave to the assembly of the states the sole power of imposing taxes. He received Dauphiné in gift 1349, purchased Majorca from its king, and died the next year, neither loved nor respected. He was a despiser of learning, and a bigot.

PHILIPPE LE HARDI, *lĕh hâr-dē'* (*Philip the Bold*), Duke of Burgundy: founder of the second and last ducal house of Burgundy—a famous and splendid ducal line rivalling that of many European dynasties: 1342, Jan. 15—1404, Apr. 27 (ruled 1363-1404); third son of Jean, King of France, and his wife Bonne of Luxemburg. He was present at the battle of Poitiers (1356), and showed such heroic courage, venturing his own life to save his father, as gained for him the sobriquet 'the Bold.' He shared his father's captivity in England; and returning to France 1360, received in reward of his bravery the duchy of Touraine, and subsequently (1363) that of Burgundy, being created at the same time the first peer of France. On the accession of his brother, Charles V., to the throne of France, P. had to resign Touraine; but, as compensation, obtained in marriage Margaret, heiress of Flanders. In 1372 he commanded the French army opposed to the English, and took many of the English possessions. In 1380 he exerted himself to suppress the sedition of the Flemish towns against their count, and succeeded with some of the malcontents; but the citizens of some of the populous places, especially Ghent, were possessed with such a fever of independence, that after many fruitless attempts to induce them to return to their allegiance, P. raised an army, and inflicted on them the bloody defeat of Rosbeck, 1382, Nov. 27, leaving 26,000 of them dead or wounded on the field. Flanders, the county of Burgundy, Artois, Rethel, and Nevers fell to him by the death of the count 1384; and he soon won the affection and esteem of his new subjects. Energy and wisdom characterized his rule; arts, manufactures, and commerce were encouraged, and his territory (a kingdom in extent) was one of the best governed in Europe. During the minority and subsequent imbecility of his nephew Charles VI. of France, he was obliged to take the helm of affairs, and preserve the state from insurrection and sedition within, and the attacks of the English without. He was on his way to repel an English attack on Flanders when he died at the chateau of Hall in Brabant, a little s.w. of Brussels.

PHILIPPE LE BON, *lĕhbōng* (*Philip the Good*), Duke of Burgundy: 1396, June 13—1467, July 15 (ruled 1419–67); b. Dijon, the cap. of the duchy; son of Jean 'Sans-peur' by Margaret of Bavaria, and grandson of Philip the Bold. At the assassination of his father on the bridge of Montereau, at the instigation of the dauphin (afterward Charles VII.), P. succeeded to the duchy of Burgundy. Bent on avenging the murder of his father, he entered into offensive and defensive alliance with Henry V. of England at Arras 1419, at the same time recognizing him as the rightful regent of France, and heir to the throne after Charles VI.'s death. This agreement, which disregarded the Salic law, was sanctioned by the king, parliament, university, and states-general of France by the treaty of Troyes; but the dauphin declined to resign his rights, and took to arms; he was, however, defeated at Crevant 1423, and Verneuil 1424, and driven beyond the Loire. Some disputes with the English prompted P. to conclude a treaty with the king of France 1429; but the English, by ceding to P. the province of Champagne, and paying him a large sum of money, regained him to their side. At this time, by becoming heir to Brabant, Holland, Zealand, and the rest of the Low Countries, P. was at the head of the most flourishing and powerful realm in w. Europe; but though much more powerful than his superior, the king of France, he preferred to continue in nominal subjection. Smarting under some fresh insults of the English viceroy, and being strongly urged by the pope, he made a final peace (1435) with Charles, who gladly accepted it even on the hard conditions which P. prescribed. The English, in revenge, committed great havoc among the merchant navies of Flanders; whereupon P. declared war against them, and, in conjunction with the king of France, gradually expelled them from their French possessions. The imposition of taxes, which were necessarily heavy, excited a rebellion, headed, as usual, by the citizens of Ghent; but the duke inflicted on them a terrible defeat 1451, July, though he wept over a victory bought with the blood of 20,000 of his subjects. The latter part of his reign was filled with trouble caused by the quarrels between Charles VII. and his son, the dauphin Louis (afterwards Louis XI.), who had fled from his father's court, and sought shelter with P.; and who, after ascending the throne, far from showing gratitude, tried in the most dishonorable manner to injure his benefactor. P. died at Bruges, deeply lamented by his subjects. Under him, Burgundy was the most wealthy, prosperous, and tranquil state in Europe; its ruler was the most feared and admired sovereign of his time, and his court far surpassed in brilliancy those of his contemporaries. Knights and nobles from all parts of Europe flocked to his jousts and tournaments.

PHILIPPE EGALITÉ: see ORLEANS, LOUIS PHILIPPE JOSEPH, DUC D'.

PHILIPPEVILLE, *fē-lēp-vēl′:* thriving town and seaport of Algeria, province of Constantine, 40 m. n.n.e. of the city of Constantine; on the Gulf of Stora, between Cape Boujaroun and Cape de Fer. It was laid out 1838 by Marshal Valée, on the ruins of the anc. Russicada, and is one of the prettiest towns in Algeria, and thoroughly French in its character. It is an important entrepôt of the commerce of e. Algeria; and the country in the vicinity is picturesque and fertile, producing grain, tobacco, cotton, flax, and fruits. It contains numerous public offices, a large hospital and dispensary, Rom Cath. and Prot. churches, public library and museum, theatre, etc. In the vicinity are quarries of the famous Filfila marble. A harbor has been constructed, including a pier and dock, affording shelter to small merchant ships. There are several establishments for curing fish, and there is trade in grain and in fabrics of native manufacture. P. is the chief station of the railway for the province of Constantine, and is connected by steamer with Marseille and Algiers. Pop. (1881) 15,580; (1891) 22,177.

PHILIPPI, *fĭ-lĭp′ī:* city of Macedonia, not far from the coast of the Ægean Sea; named after Philip II. of Macedon, who conquered it from Thrace (till which time it had been called Crenides or the 'Place of Fountains'), and who enlarged it because of the gold-mines in its neighborhood. Philip worked the mines so well, that he got from them about 1,000 talents a year (= probably $1,200,000). It is famous for the two battles (B.C. 42) between Antony and Octavianus on one side, and the republicans under Brutus and Cassius on the other. The first engagement was undecided; in the second, 20 days afterward, the republic finally perished. The apostle Paul founded a Christian church here A.D. 53, to which is addressed his Epistle to the Philippians (q v.). The ruins of the city still bear the name Philippi or Felibe.

PHILIPPIANS, *fi-lĭp′pĭ-anz*, EPISTLE TO THE: one of the latest of the Pauline epistles in the New Test., written probably at Rome during the apostle's imprisonment (conjecturally about A.D. 63), and transmitted through Epaphroditus, apparently a pastor of the Philippian church, who had been sent to minister to the necessities of the apostle. The Philippian church was held in peculiar tenderness and affection by Paul. It was the first fruits of his evangelization in Europe; its members were singularly kind toward him; again and again, when he was laboring in other cities, e.g., Thessalonica and Corinth, they sent him contributions that he might not be burdensome to his new converts; and now they had sent one of the brethren all the way to Rome with presents for him, knowing that he was in bonds, and suspecting—what was in fact the case—that he might be in sore straits for his daily bread. His letter to them is deeply affecting. It contains not so much doctrinal matter, as a warm outpouring of his personal feelings toward his friends at Philippi, with some practical moral instruction peculiarly fitted to their needs. Its general character, though sounding forth from a prison, is that of a strain of triumph. The historical evidence in favor of the authenticity of the epistle is so strong, that it could hardly give way to any internal criticism; and the objections on that ground of merely vague conjecture, urged by Baur, Schwegler, and others of the Tübingen school, who regard it as a Gnostic composition of the 2d c., are regarded as preposterous even by many Biblical scholars who do not profess to be orthodox. Reference to it was made by Marcion, A.D. 140, it is quoted 177, in the letter of the churches of Lyons and Vienne; it is in the canonical lists of Eusebius, and the early councils, and is mentioned by the early fathers, e.g., Irenæus, Tertullian, and Clement of Alexandria. It has been well said that some of the original Philippian Christians might have been living when Polycarp wrote his letter to the Philippian church, A.D. 107, referring to Paul's epistle. Certainly Paul's cherished writing would be well known to those whom Polycarp addressed.

A passage of unusual doctrinal importance is ii. 5–7, as indicating Paul's Christology (comp. II Cor. viii. 9). This statement that Christ 'emptied himself' in his redemption of man, has given rise to interesting and profound discussion.—Valuable commentaries on this epistle are those of B. Weiss, Lightfoot, and Meyer.

PHILIPPIC, n. *fi-lĭp′ĭk* [after *Philip*, King of Macedon, in Greece]: originally one of the three orations or speeches of Demosthenes addressed to the Greeks against Philip. The name Philippics was afterward applied to Cicero's orations against the ambitious and dangerous designs of Mark Antony. It now designates any severe and violent invective, oral or written.

PHILIPPINE ISLANDS, *fĭl'ĭp-pēn* or *-pĭn:* extensive island group or archipelago of s.e. Asia; an American possession ceded by Spain to the United States at the close of the SPANISH-AMERICAN WAR (q.v.) according to the provisions of the Treaty of Paris, signed 1898, Dec. 10; n. of Borneo and Celebes; 4° 40′—21° 10′ n. lat., and 116° 40′—126° 34′ e. long; extreme length of archipelago n. to s. probably about 1,150 m., extreme breadth e. to w. 682 m.; number, probably more than 1,500; conjectural area about 127,850 sq. m. There are 12 principal islands and three groups. Pop. (1900) 6,975,073, which did not include the United States forces. The chief city of the group, Manila (q.v.) is situated on the island of Luzon, which with its neighboring islands had (1900) a population of 3,727,488.

Mindanao or Magindanao, in the s., the largest island (length nearly 271 m., greatest breadth about 386 m.) has 45,559 sq. m.; and Luzon, in the n., second largest (length nearly 489 m., greatest breadth 138 m.—very irregular in outline), has 43,075 sq. m. The islands between Luzon and Mindanao are called the Bissayas or Visayos, the largest of which are—Samar, 156 m. long, 75 m. wide, 5,488 sq. m.; Panay, 4,752; Leyte, 21 m. long, 52 m. wide, 1,732 sq. m.; Negros, 4,854; Masbate, 1,732; and Cebu or Zebu, 1,782, an important island, 139 m. long, 24 m. broad. There are more than a thousand smaller islands of which little is known. S.w. of the Bissayas lies the long, narrow island of Paragoa or Palawan, 158 m. long, 10-30 m. wide, 3,002 sq. m.; formed of a mountain-chain with low coastlines, cut with numerous streams, and exceedingly fertile; the forests abound in ebony, logwood, gum-trees, and bamboos. N. of Luzon lie the Batanen, Bashee, and Babuyan Islands, the first two groups having about 8,000 inhabitants, the last 1,280.

The Sulu Islands form a long chain from Mindanao to Borneo, having the same mountainous and volcanic structure as the P. I., and all probably fragments of a submerged continent. Many active volcanoes are scattered through the P. I., Mayon, in Luzon, and Buhayan, in Mindanao, being often in eruption and causing terrible devastation. The mountain-chains run n. and s., with no summits higher than 9,000 ft., except perhaps Apo on Mindanao, reported between 10,000 and 11,000 ft. The islands have many rivers—the largest on Luzon being the Rio Grande de Cagayan; and the largest on Mindanao being the Agusan, more than 200 m. long. The coasts are indented with deep bays, and there are many lakes in the interior. Earthquakes are frequent and destructive, Manila, the cap., having been nearly destroyed by one 1863. In 1864 another terrific earthquake visited Mindanao, destroying most of the houses. The most violent earthquakes on record were in 1880, July: three successive earthquakes in that year did immense damage, especially in Manila, where many buildings were totally ruined. The soil is fertile, except where extensive marshes occur. In Mindanao are numerous lakes, which expand during the rainy seasons into inland seas. The n. and s. extent of the P. I. gives noticeable varieties of climate, though all are tropical. Rain may be expected from May to Dec., and from June to Nov. the land is flooded. Violent hurricanes are experienced in the n. of Luzon and on the w. coast of Mindanao. Especially during the changes of the monsoons, storms of wind, rain, thunder and lightning prevail. The weather is delightful, and heat moderate, from Dec. to May, after which the temperature rapidly rises and becomes oppressive, except for a short time after a fall of rain. The fertility of the soil and the humid atmosphere produce a richness of vegetation nowhere surpassed. Blossoms and fruit hang together on the trees, and the cultivated fields yield a constant succession of crops.

Immense forests spread over the P. I., clothing the mountains to their summits; ebony, iron-wood, cedar, sapan-wood, gum-trees, etc., being laced together and garlanded by the bush-rope or palasan, which attains a length of several hundred ft. The variety of fruit-trees is great, including the orange, citron, bread-fruit, mango, cocoa-nut, guava, tamarind, rose-apple, etc.: other important products of the vegetable kingdom are the banana, plantain, pineapple, sugar-cane, cotton, tobacco, indigo, coffee, cocoa, cinnamon, vanilla, cassia, the areca-nut, ginger, pepper, etc., with rice, wheat, maize, and various other cereals.

Gold is found in river-beds and detrital deposits, being used, in form of dust, as the medium of exchange in Mindanao. Iron is plentiful, though scarcely at all worked; and two fine coal-beds have been found. Copper has long been worked in Luzon. There are also limestone, a fine variegated marble, sulphur in unlimited quantity, quicksilver, vermilion, and saltpetre—the sulphur being found both native and in combination with copper, arsenic, and iron.

Except the wild cat, beasts of prey are unknown. There are oxen, buffaloes, sheep, goats, swine, harts, squirrels, and a great variety of monkeys. The jungles swarm with lizards, snakes, and other reptilia; the rivers and lakes with crocodiles. Huge spiders, tarantulas, white ants, mosquitoes, and locusts are plagues which form a set-off to the beautiful fireflies, the brilliant queen-beetle (*Elater noctilucus*), the melody of myriads of birds, the turtle-doves, pheasants, birds of paradise, and many lovely species of paroquets, with which the forests are alive. 'Hives of wild bees hang from the branches, and alongside of them are the nests of humming-birds dangling in the wind.' The caverns along the shores are frequented by the swallow, whose edible nest is esteemed by the Chinese a rich delicacy. Some of them are tenanted also by multitudes of bats of immense size. Buffaloes are used for tillage and draught; small horses for riding. Fowls are plentiful, and incredible numbers of ducks are artificially hatched. Fish is in great abundance and variety. Mother-of-pearl, coral, amber and tortoise-shell are important articles of commerce.

The Tagals and Visayas are the most numerous native races. They dwell in the cities and cultivated lowlands; 3,500,000 being converts to Roman Catholicism; and a considerable number, especially of the Visayas, Mohammedan. The mountain districts are inhabited by a negro race, who, in features, stature, and savage mode of living, closely resemble the Alfoors of the interior of Papua, and are probably the aborigines driven back before the inroads of the Malays. A few of the negroes are Christian, but they are chiefly idolaters, or without any manifest form of religion, and roaming about in families, without fixed dwelling. The Mestizos are an influential part of the population; by their activity engrossing the greatest share of the trade. These are mostly of Chinese fathers and native mothers. Few Spaniards reside in the P. I., and the leading mercantile houses are English and American. The foreign residents, chiefly Chinese, number not less than 33,000 or 34,000; the Americans are very few. The Chinese are an important element in the population; they exercise various trades and callings, remaining only for a time, and never bringing their wives with them. The principal languages are the Tagalese and Visayan. Rice, sweet potatoes, fish, flesh and fruits form the food of the Tagals and Visayans, who usually drink only water, though sometimes indulging in cocoa-wine. Tobacco is used by all. They are gentle, hospitable, fond of dancing and cock-fighting. The languages, with the exception of the Negrito (that of the aborigines) are similar, and are supposed to be derived from the Malay. Spanish is spoken by all educated people, but the use of the English language is rapidly spreading. Under Spanish rule education was exceedingly backward. After the accession of civil administration, a systematic plan of educational promotion was put in operation by the estab. of a department of public instruction, and 1,000 trained teachers were brought from the U. S. Manila has nautical, normal, trade schools; Negus, agric. school. R. Caths. have been vigorous and reasonably prosperous in their missions in these islands. There is a Rom. Cath. abp. of Manila, and bishops of New Segovia, Nueva Caceres, and Zebu. Religious processions are the pride of the people, and are formed with great parade, thousands of persons carrying wax-candles, etc. The natives not only build canoes, but ships of considerable tonnage. They weave various textile fabrics of silk, cotton, abaca, and very fine shawls and handkerchiefs from the fibre of pineapple leaves. These are called pinas, and often sell for one or two ounces of gold apiece. The pinilian is the finest sort, and is made only to order—one for the queen of Spain costing $500. The people work in horn, make silver and gold chains, fine hats and cigar-cases of fibres, and beautiful mats of different colors, ornamented with gold and silver. The gov. gen. is appointed by the President and resides at Manila (q.v.).

It is to be remembered that all the ports of this archipelago, except Sual, Iloilo, Zebu, Zamboanga, Legazpi, Tacloban, and Manila, were long closed against foreign vessels. Trade, always restricted, was 1785 still further limited to the Royal Co. of the Philippines: 1834 this monopoly expired, and since the beginning of the 19th c. liberty of trade has been gradually increased. In six years 1875–80, total imports rose in value from $11,987,162 to $25,493,319; total exports from $14,837,796 to $23,450,285. In the same six years the tonnage entered increased from 235,418 to 449,937; cleared, from 222,613 to 459,145: the Amer. trade (N. and S. Amer.) increased from 101 vessels with 129,439 tons, to 164 vessels with 202,653 tons. In 1901 8,588 vessels (5,388 sailing), of 1,644,368 net tonnage, entered P. ports and 9,217 (6,018 sailing), of 1,627,818 net tonnage cleared. Trade with Great Britain has been in a fluctuating condition for many years, though with recent commercial progress. One of the great obstructions to trade ceased 1883: the strict govt. monopoly of tobacco-planting and trade was in that year given up. The total value of exports (1893) was $30,000,000, including sugar $18,000,000. The total value of imports for the 12 months ending 1902, Dec. 31, was $33,342,166, as against $30,162,471 in 1901; imports of domestic merchandise from the United States $4,728,555, chiefly carried in foreign vessels; value exports abt. $29,000,000; $10,211,303 worth went to the United States. On an average about 34 per cent. of imports are from the United Kingdom, 21 per cent. being from Hong Kong and Amoy, 13 per cent. from Spain, and 10 per cent. from Singapore and British India. The principal exports are sugar, tobacco, cigars, indigo, Manila hemp or Abaca (q.v.), coffee, rice, dye-woods, hides, gold-dust and bees'-wax. Cotton, woolen and silk goods, agricultural implements, watches, jewelry, etc., are imported. British and American merchants do the largest business, the imports from Great Britain being about £900,000. The revenue (1886) aggregated 11,528,178 P. I. dollars (a P. I. dollar or peso is equal to 80-85 cts. (American gold), and included $6,262,738 from direct taxes. The revenues for the fiscal year ending 1901, June 30, aggregated $20,712,930, of which $17,666,417 was from customs; expenditures, $14,379,601. There are but few railroads in the archipelago, the longest being in Luzon.

The Sulu Islands have pop. 150,000; are governed by a sultan (under United States sovereignty), whose capital is Sulu, 6° 3′ 40″ n. lat., and 120° 58′ e. long.

Luzon had formerly a pop. 2,500,000, one-fifth part of the island being independent; the Bissayas islands, 2,000,000 almost entirely under native rule. The pop. of Luzon now amounts to 3,727,500; of the Bissayas to 2,500,000; of Panay to 462,500; of Cebu to 518,000.

The pop. of Mindanao is about 495,659; formerly the districts of Zamboanga, Misamis and Caragan, with 100,000 inhabitants, were all that were subject to Spain. The greater part of the island was under the sultan of Mindanao, resident at Selanga, 7° 9′ n. lat. and 124° 38′ e. long, who, with his chiefs, could bring together an army of 100,000 men. Besides Manila, there are very many large and important cities, especially in Luzon, Panay, and Cebu. The chief centres of trade are Manila in Luzon, and Iloilo in Panay.

The P. I. were discovered 1521 by Magellan, who, after visiting Mindanao, sailed to Cebu, where, taking part with the king in a war, he was wounded, and died at Mactan, 1521, Apr. 26. A few years later the Spanish court sent an expedition under Villalobos, who named the islands in honor of the Prince of Asturias, afterward Philip II. The subjugation of the islands by Spain was less by force of arms than by the influence of the Rom. Cath. missionaries, to whom Philip had committed great power. For some time the chief Spanish settlement was on Cebu; but 1581 Manila was built, and has since continued to be the seat of government. On the cession of the P. I., 1898, the Spanish troops were gradually withdrawn. The navy, which, previous to 1898, May 1, was quite formidable, was destroyed on that date by Commodore Dewey (q.v.), of the U. S. Navy. On 1898, Dec. 10, a treaty of peace between the United States and Spain was signed. On 1902, July 4, civil government was established, and amnesty was granted political prisoners.

PHILIPPINS, *fĭl′ĭp-pĭnz:* Russian sect, named from the founder, Philip Pustoswiät, under whose leadership they emigrated from Russia in the end of the 17th c. They are a branch of the RASKOLNIKS (q.v.). They call themselves Starowerski, or 'Old Faith Men,' because they cling with utmost tenacity to the old service-books, the old version of the Bible, and the old hymn and prayer-books of the Russo-Greek Church, in the exact form in which these books stood before revision by the patriarch Nikon in the middle of the 17th c. There are two classes of the Raskolniks—one which recognizes popes (Russian priests); the other which admits no priest or other clerical functionary. The P. are of the latter class; and they not only themselves refuse all priestly ministrations, but they regard all such ministrations—baptism, marriage, sacraments—as invalid; and they rebaptize all who join their sect from other Russian communities. All their own ministerial offices are discharged by the Starik, or parish elder, who for the time takes the title of pope, and is required to observe celibacy. Among the P. fanaticism at times has run to the wildest excesses. They refuse oaths, and decline to enter military service; and having, on account of this, and many other incompatibilities of the system with the Russian practice, encountered much persecution, they resolved to emigrate. Accordingly, 1700, under the leadership of Philip Pustoswiät, they settled partly in Polish Lithuania, partly afterward in e. Prussia, where they still have several small settlements with churches of their own rite. They are reported to be a peaceable and orderly race. Their principal pursuit is agriculture; and their thrifty and industrious habits have secured for them the good-will of the proprietors.

PHILIPPOPOLIS, *fĭl-ĭp-ŏp'ō-lĭs*, or FILIPPOPEL (Turk. *Felibe*): Thracian city, chief town of the recently organized province of Eastern Roumelia, Turkey; 112 m. w.n.w. from Adrianople, 309 m. from Constantinople; on a small island formed by the Maritza, which here becomes navigable. This island rises as a hill in a vast plain, which extends beyond Adrianople on the e., and from the base of the Rhodope Mts. on the s., to the Balkan chain on the n. The plain is extremely fertile. The city was named from its capture by Philip of Macedon, who made it one of his frontier posts. By the Romans it was known as Trimontium. It was the anc. cap. of Thrace, and at its destruction by the Goths 100,000 people are said to have been slain. In 1360 it came under Turkish rule, suffered from earthquake 1818, and from conflagration 1846. The Russian forces occupied the city 1877,8. P. has very extensive commerce, and is the seat of a Greek abp. Three-fifths of the inhabitants are Christians, one-fifth Jews and gipsies, the remainder Mohammedans. Pop. (1888) 33,442; (1900) 42,849.

PHILIPPSBURG, *fē'lĭps-bûrċh:* town of Baden, on the right bank of the Rhine; anciently one of the most important fortresses on the Rhine, taken and retaken frequently by French, Germans, or Swedes. The fortifications were destroyed 1800. Pop. (1895) 2,469.

PHILIPS, *fĭl'ĭps*, AMBROSE: 1675–1749; b. Shropshire, England. He took his degree M.A. at St. John's College, Cambridge, 1700. In 1709 his Pastorals appeared, with those of Pope, in *Tonson's Miscellany;* and 1712 he brought on the stage *The Distressed Mother*, a tragedy adapted from Racine's *Andromaque*, which had great success. Some translations from Sappho, in the *Spectator*, added greatly to P.'s reputation, but Addison is believed to have assisted in these classic fragments. Exaggerated praise of P. having appeared in the *Guardian*, Pope ridiculed his Pastorals in a piece of exquisite irony, which led to a bitter feud; and P. even threatened personal chastisement, and hung up a rod in Button's Coffee-house, but no encounter took place. One of the names fastened upon P. was 'Namby Pamby,' from a style of verse adopted by him in complimentary effusions, consisting of short lines and a sort of infantine simplicity of diction, yet not destitute of grace or melody. In his later years he held various govt. appointments. P. is known in literary history from the friendship of Addison and the enmity of Pope; but his poetry, lacking energy and passion, has fallen out of view.

PHILIPSE, *fil'ips*, FREDERICK: 1626–1702, Dec. 23; b. Holland. He belonged to a noble family, came to New Amsterdam about 1640, learned the carpenter's trade, went into business and accumulated considerable property. By marriage to a wealthy widow he secured the control of valuable estates. He engaged in the African slave trade, and also had a large business with the Indies. After his wife died he married a Miss Van Cortland 1690, who inherited a large fortune. P. obtained from the govt. and the Indians a large tract of land between Spuyten Duyvil and the Croton river, and secured from the king a manorial charter covering the present town of Yonkers and 150 sq. m. His manor house is still standing in Yonkers, and an Episcopal church which he erected is said to be the oldest building of the kind in the country. For many years he was a member of the council of the royal governor.—His grandson, FREDERICK P., 1690–1751; b. New York. He was educated in Europe, after which he returned to his inherited manor as the head of his family. He was judge as well as feudal sovereign, and even inflicted capital punishment.—FREDERICK P., 1746–1785; b. New York, son of the latter Frederick. He graduated from Columbia College, lived in magnificent style; was banished with confiscation of property for taking sides with the British in the revolution; and died in England.

PHILIPSTOWN, *fil'ips-town:* market and post town of King's county, province of Leinster, Ireland, 47 m. s.w. of Dublin. Its charter dates from 1567. It long since lost all its former importance. Pop. about 1,000, principally Rom. Catholics.

PHILISTINE, n. *fi-lis'tin* [Eth. *phalasa*, to wander about]: one of the anc. inhabitants of the s.w. coast of Palestine (see PHILISTINES). In *Germany*, a term applied to the non-academic portion of a university town, as opposed to the *gown;* also to all non-students in general. The term was applied by Matthew Arnold to the middle class of England, which, he says, is ignorant, strenuously obstructive, and narrow-minded; and in current literature it denotes a prosaic, stolid person. A wider application is indicated by Leslie Stephen's definition of P. as 'a term of contempt applied by prigs to the rest of their species.' PHILIS'TINISM, n. *-izm*, manners or practices of the (modern) Philistines.

PHILISTINES, *fi-lĭs′tĭnz* (in the Septuagint, *Allophuloi*, Strangers): term derived from a root *phalasa* (Eth.), to emigrate, wander about (see PHILISTINE), or identified with Pelasgi, or (as some say) to be compared with *Shefela* (Heb.), lowlanders; designating a population mentioned in the Bible as being in frequent contact with the Jews, and living on the coast of the Mediterranean, s.w. of Judæa, from Ekron toward the Egyptian frontier, bordering principally on the tribes of Dan, Simeon, and Judah. Our information about the origin of the P. is extremely obscure and contradictory. The genealogical table, Gen. x. 14, counts them among the Egyptian colonies (the 'Casluhim, out of whom came Philistim'); according to Amos ix. 7, Jer. xlvii. 4, and Deut. ii. 23, they came from Caphtor. But supposing that the Casluhim were some separate tribe, and yet Caphtorian colonists, the question remains, whether Caphtor can be identified with Cappadocia in Asia Minor, as the early versions (*LXX.*, *Targ.*, *Pesh.*, *Vulg.*) have it; or whether it be Pelusium, Cyprus, or the Isle of Crete. The latter opinion seems not the least probable. At what time they first immigrated, and drove out the Canaanitish inhabitants, the Avvim, is difficult to conjecture. They appear to have been in the country as early as the time of Abraham; and in the history of Isaac, Abimelech, King of Gerar, is distinctly called king of the P. Yet, even supposing that in Genesis the country is designated by the name which it bore at a later period, there can yet be no doubt of the people being firmly established at the time of Moses (Ex. xv. 14, etc.). Thus the date of their immigration would have to be placed not later than about B.C. 1800. At the Exodus, Moses, evidently fearing for his undisciplined band an encounter with the warlike colony, did not choose the shorter way to Canaan through their territory, but preferred the well-known circuitous route. At a later period, however, Joshua, having triumphed over 31 Canaanite princes, conceived the plan of making himself master of the possessions of the P. also; but his intended disposal of their country for the benefit of the tribe of Judah was never accomplished. At this time, they were subject to five princes (Seranim = axles, pivots), who ruled over the provinces of Gaza, Ashdod, Askelon, Gath, and Ekron. Not before the period of the Judges did they come into open collision with the Israelites; and the strength and importance in which they then suddenly appear, contrast so strangely with their insignificance at the time of the patriarchs, that many theories—a double immigration principally—have been propounded in explanation. We find them daring to face powerful nations like the Sidonians, whom, about B.C. 1209, they forced to transfer their capital to a more secure position on the island of Tyre; or the Egyptians under Rameses III., with whom they engaged in naval warfare at the same time. With the Israelites their war was of the nature of guerilla raids, sometimes into the very heart of the country. Under Shamgar, about B.C. 1370, they were repulsed, with a loss of 600 men; however, about 200 years later, the Israelites were tributary to them, and continued to groan under their attacks, with occasional pauses only, until Samson first began to humiliate them. But they were still so powerful at the time of Eli, that they carried away the ark of the covenant. Under Samuel, their rule was terminated by the battle of Mizpah. Saul was constantly engaged in warding off their new encroachments; and at Gilboa, he and his sons fell in a disastrous battle against them. At this time, they seem to have returned to their primitive form of a monarchy, limited, however, by a powerful aristocracy, the king's formal title again being 'Abimelech' = 'Father-king,' as we find it in Genesis. David succeeded in routing them repeatedly; and under Solomon their whole country seems to have been incorporated in the Jewish empire. The subsequent internal troubles of Judæa emboldened the P. once more to open resistance. Under Joram, in union with the Arabians, they invaded Judæa; and not only carried away the royal property, but also the sérail and the royal children. Uzziah, however, recovered the lost ground; he overthrew them, and dismantled some of their most powerful fortresses—Gath, Yabne, and Ashdod—and erected forts in different parts of their country. Under Ahaz, they rose again, and attacked the border-cities of the 'plain' on the s. of Judah; and a few years later, renewed their attacks, in league with the Syrians and Assyrians. Hezekiah, in the first years of his reign, subjected their whole country again, by the aid of the Egyptians, whom we find in the possession of five cities. The Assyrians, however, took Ashdod, under Tartan, which was retaken again by Psammetich, after 29 years' siege. About this time, Philistæa was traversed by a Scythian horde on their way to Egypt, who pillaged the temple of Venus at Askelon. In the terrible struggles for supremacy which raged between the Chaldæans and Egyptians, Philistæa was the constant battle-ground of both—her fortresses being taken and retaken by each in turn; so that the country soon sank into ruin and insignificance. Yet a shadow of independence seems to have been left to it, judging from the threats which Zachariah (ix. 5), after the exile, utters against Gaza and Askelon, and their pride. In the time of the Maccabees, the P. were Syrian subjects, and had to suffer occasionally from the Jews, though intermarriages between the two nations were not rare. Alexander Balas transferred part of the country to Judæa; another part was taken by Alexander Jannæus; Pompey incorporated some of the cities with Roman Syria; Augustus transferred another portion to Herod; and finally, Salome, his sister, received a small principality of it, consisting of Jamnia, Ashdod, and Askelon. But by this time the name of the country had long been lost in that of Palestine, all the territory between the Lebanon and Egypt.

Of their state of culture, institutions, etc., we know very little. They appear as a civilized, agricultural, commercial, and warlike nation. They traded largely, and their wares seem to have been much sought after. Their worship was much akin to that of the Phœnicians —a nature-religion, of which Dagon, Ashtaroth, Baalzebub, and Derceto were chief deities. Priests and soothsayers abounded; their oracles were consulted even by people from afar. They carried their charms about their persons, and their deities were taken with them to the wars. They do not seem to have practiced circumcision. As to their language, so little has been known about it, that conjectures have seemed more than usually vain. Those who have assigned the P. to a Semitic origin, or to a Pelasgic, have usually assigned their languages similarly. But it is certain, that at least their proper names, as recorded in the Bible, and other names recently discovered on the Assyrian monuments, are mostly Semitic; and it has now become evident that though both before and after the captivity there existed a difference of dialect between the Hebrew and the Philistæan idiom, the difference was only dialectical.

PHILLIP, *fil'ip*, JOHN: artist: 1817, Apr. 19—1867, Feb. 27; b. Aberdeen, Scotland. Before his 15th year he had painted pictures showing his feeling for color. Aided by Lord Panmure, he went to London to pursue his studies, at first copying from the Elgin marbles at the British Museum, and after a few months admitted as student at the Royal Acad. All his early subjects were Scotch, e.g., a *Scotch Fair*, *Baptism in Scotland*, a *Scotch Washing*, *The Offering*, etc. In 1851 he went to Spain for health, and returned with a change in the character of his subjects, taking rank at the head of the painters of the habits and customs of the Spanish people. In 1853 he exhibited at the Royal Acad. *Life among the Gypsies at Seville.* His pictures for 1854–5, *A Letter-Writer of Seville* and *El Paseo*, were both purchased by the queen. In 1857 he attained the rank of associate of the Royal Acad.; and the following year exhibited a powerful picture of *Spanish Contrabandistas*, purchased by Prince Albert, of whom he also painted a portrait the same year for the town-hall of his native city. In 1859 he received the full honor of Royal Academician. His work for exhibition 1860, *The Marriage of the Princess Royal*, was pronounced by his fellow-artists and the public a decided success in a difficult field. His next portrait subject (exhibited 1863)—perhaps still more difficult—the *House of Commons*, 1860, containing more than 30 portraits of leading members of both sides of the house—was equally successful. His style is characterized by rich powerful color, broad light and shade, strong bold outline, and great variety and truthfulness of texture. No artist in his day had more power over his brush, or produced by his example a greater effect on the colorists of the present British school.

PHILLIPS, *fil'ips*, ADELAIDE: contralto vocalist (stage-name FILIPPI): 1833, Oct. 26—1882, Oct. 3; b. Stratford-on-Avon, England. She came to the United States 1840, and was put on the stage by her parents 1842, making her appearance first at Tremont Theatre, Boston. Jenny Lind advised and helped her to go to Europe. She arrived in London 1852, Mar., and began her studies with Manuel Garcia, and went next year to Italy. In that year she appeared at Brescia as Arsace in *Semiramide.* In 1855 she returned to America, and appeared at Philadelphia and in Havana. She next made a professional tour in Europe, and from 1864 till her death in Carlsbad, Germany, sang in numerous places in all parts of the United States. Miss P. had a powerful contralto voice of great range. Her personal character gained her a large circle of friends.

PHIL'LIPS, JOHN: Lawyer: 1770, Nov. 26—1823, May 23; b. Boston. He graduated at Harvard 1788, studied law, and became public prosecutor 1800, and representative to the Mass. gen. court 1803. He was state senator 1804 till his death, presiding officer of senate 1813–23. P. was active in the convention to revise the state constitution, and in obtaining the city charter for Boston 1822, and was elected first mayor of Boston 1822, Apr. 16. He declined re-election on account of delicate health. He was a member of the corporation of Harvard, and fellow of the Amer. Acad. of Arts and Sciences. He was a man of notable uprightness and of very vigorous intellect, and excelled as an orator. The great antislavery orator Wendell P. was his son.

PHIL'LIPS, JOHN, LL.D.: 1719, Dec. 6—1795, Apr. 21; b. Andover, Mass.: philanthropist. He graduated at Harvard College 1735; studied theology and began preaching; withdrew from the ministry and engaged in mercantile business in Exeter, N. H.; and became a member of the state council. In 1778 he aided his nephew, Samuel P., in founding Phillips Acad. (q.v.), at Andover, with $31,000 and a third interest in his estate; and 1781 planned and founded Phillips Exeter Acad. (q.v.), with $134,000. He also aided liberally Dartmouth College and Nassau Hall, College of N. J.

PHIL'LIPS, SAMUEL, Jr., LL.D.: jurist, legislator, and originator of Phillips Acad.: 1751, Feb. 7—1802, Feb. 10; b. Andover, Mass. He graduated at Harvard 1771. He was a member of the provincial congress, and of the constitutional convention of 1779; was 20 yrs. in the state senate, of which 15 yrs. its pres.; and lieut.gov. 1800–02. For 17 yrs., to 1798, he was judge of the court of common pleas. He interested wealthy relatives in founding Phillips Acad. (q.v.) (of which the Andover Theol. Seminary was an after-branch), and prepared its plan and charter; was a founder of the Boston Acad. of Arts and Sciences; and left to his native town a fund for education. He died at Andover. A memoir of his life was published by John L. Taylor, 1856.

PHIL'LIPS, Wendell: reformer and orator: 1811, Nov. 29—1884, Feb. 2; b. Boston; son of John P., first mayor of that city. He entered the Boston Latin School 1822; graduated at Harvard 1831, and at the law school 1833. While an undergraduate, he was a thorough student of history, and excelled in elocution and debate. His religious life began under the preaching of Dr. Lyman Beecher, and he retained through life the evangelical faith of his parents. Admitted to the bar 1834, he witnessed, 1835, Oct. 21, the dragging of William Lloyd Garrison through the streets by a mob of 'gentlemen of property and respectability.' From that day he avowed the anti-slavery sentiments that he had already imbibed from Miss Anne Terry Greene, who became his wife. He sacrificed for a despised cause all the advantages of his high social position, fine education, and personal graces; and 1839 relinquished the profession of law because he would not act under attorney's oath to support the constitution of the United States, with its guaranties to slavery. His first remarkable speech was in Faneuil Hall, 1837, Dec. 8, at a meeting promoted by Dr. William E. Channing, to denounce the murder of the Rev. Elijah P. Lovejoy by a mob at Alton, Ill. Atty.Gen. James T. Austin opposed the resolutions, comparing the pro-slavery mob to revolutionary patriots. Phillips was called up to reply, and poured forth a most scathing and eloquent rebuke. He opposed, 1839–40, the denial of equal rights to women in anti-slavery societies, and any divisions on the score of religious belief; also, any action of anti-slavery men as a political party. In 1840 he went as a delegate of the Mass. abolitionists to the World's Anti-Slavery Convention, London, and there advocated admission of women as members. In 1843–4 he was prominent in denouncing the compromises of the U. S. constitution, and then, and far into the 'fifties,' showed serene courage in speaking boldly in the face of threatened attacks of mobs. During the war he urged emancipation before it was proclaimed. For many years he was pres. of the Amer. Anti-Slavery Soc. In his latter years he advocated the cause of the Indians, penal reform, woman suffrage, greenback currency, and especially labor reform, opposing the wage and present financial systems. He was candidate of the labor-reform party for gov. of Massachusetts 1870. His last address was at the unveiling of a statue of Harriet Martineau in the Old South Church building, which is a memorial hall. As a speaker, he was quiet and graceful in manner, with great force of thought and language, and, on special occasions, manifesting a suppressed energy and feeling more effective than noisy action. He was almost universally conceded a high place among the most finished and impressive orators of the 19th c. At all times he was fearlessly outspoken. As a lecturer he was in great demand, on such subjects as the Lost Arts, and the life and work of Toussaint l'Ouverture and Daniel O'Connell.

He died in Boston. Besides his numerous contributions to anti-slavery periodicals, he published: *The Constitution a Pro-Slavery Compact* (1840); *Can Abolitionists Vote or Take Office?* (1845); *Review of Spooner's Unconstitutionality of Slavery* (1847); *Review of Webster's 7th-of-March Speech* (1850); *Review of Kossuth's Course* (1851); *Defence of the Anti-Slavery Movement* (1853); *Addresses* (1859); *Speeches, Lectures, and Letters* (1863). His life was published by George L. Austin, 1888.

PHIL'LIPS ACADEMY; Andover, Mass.: noted Eng. and class. school for boys; established by Judge Samuel Phillips, Jr. (q.v.), through the munificence of his father, and of John Phillips, LL.D. The early contributions of the Phillips family amounted to about $50,000. South Andover, instead of North (Judge P.'s native place), was chosen for ample space and opportunity of proper moral control. Ground was bought 1777, and increased to 187 acres; later, all 'Andover Hill' came under control of the trustees. An old carpenter-shop, standing at the time of purchase, housed the first school, opened 1778, Apr. 30, accommodating 30 pupils. Within two years there were 60, and in its second decade the school attracted pupils from the whole country and from other lands. It was chartered 1780. The founder provided in its constitution that the master should instruct and establish the pupils in Christianity—a purpose since fulfilled. But, 1807, the 'Class in Theology,' which had educated young men for the ministry, became a distinct institution as a theol. seminary, the first of the kind in this country. A dept. for common-school teachers, antedating our normal schools, was opened 1830; but, 1842, for lack of funds, resolved itself into an Eng. dept. of the acad. The principals of P. A. have been distinguished for worthiness and thoroughness, especially Dr. Samuel H. Taylor, 1837–71. Between 9,000 and 10,000 boys were students in the academy during the first century of its existence, and up to the year 1885 there had been more than 3,000 graduates, including very many eminent men. The acad. takes high rank as a training-school for Harvard and Yale universities, and for colleges generally. The present buildings are a large Acad. Hall, eleven dormitories, five dwelling-houses, a chem. laboratory, and gymnasium. Besides a collection of 3,300 vols., students have access to the theol. seminary and memorial hall libraries of 55,000 vols. The cash endowment of the acad. is about $250,000. The buildings, etc., are valued at $100,000, scholarship and beneficiary funds $39,900. Needy students may have free tuition. The faculty numbers 21. Each dept. has a 4 years' course. The class dept., 1901, had 227 students; the scientific, 201 secondary students; total, 428.

PHILLIPSBURG, *fĭl ĭps-berg:* town in Warren co., N. J.; on the Central r.r. of New Jersey, the Lehigh Valley, the Delaware, Lackawanna and Western, and the Pennsylvania railroads, and on the Delaware river; 74 m. from New York. There are seven churches, a good school system, a weekly newspaper, and 2 national banks (cap. $300,000). Iron manufacturing is conducted on an extensive scale. The Delaware is crossed by two railroad bridges. Easton, Penn., is on the opposite side of the river. Pop. (1880) 7,181; (1890) 8,644; (1900) 10,052.

PHIL'LIPS EXETER ACADEMY: classical and English school for boys, at Exeter, N. H.; founded by John Phillips, LL.D., 1781; opened 1783, May 1. The whole amount of his gifts was about $60,000. He provided that the trustees and teachers should be Prot., and the principal a member of a church of Christ. The total of other cash gifts to 1890, June 30, is nearly $400,000, of which $252,000 appears to be general endowment, the new acad. building (the old burned 1870) $46,129, gymnasium $4,197, book-fund $300, and the rest scholarship funds. The largest donations were from John L. Sibley, Jeremiah Kingman, Woodbridge Odlin, Henry Winkley, John C. Phillips, Francis P. Hurd, and Francis E. Parker (the last, $112,464). The buildings include Abbot Hall, with accommodations for 50 students; phys. laboratory, expensively equipped and with a woodworking shop; chem. laboratory, 3 stories, fire-proof; and 2-story gymnasium, 100 x 60 ft. The campus is of 7 acres. Harlan Page Amen, A.M., was elected principal 1895. The catalogue 1900-01 enrolls 190 classical students, 90 in the scientific course and 116 secondary students; total 396. The academy has always ranked among the very highest, especially as preparatory for a course.

PHILLYREA: see PHYLLIREA.

PHILO-, *fī-lo-*, PHIL-, *fĭl-*, prefix [Gr. *philos*, loving]: **fond of; affecting; cultivating.**

PHILO, *fī′lo* (often called PHILO JUDÆUS, *fī′lo ju-dē′us*), *the Philosopher* (there being another Jewish Greek writer of this name): born at Alexandria, prob. between B.C. 20 and 10. Belonging to one of the wealthy and aristocratic families—his brother was the Alabarch Alexander—he received the most liberal education; and in a rare zeal for learning, he at a very early age had passed the ordinary course of Greek studies. Although every one of the different free sciences and arts included in the *Encyclika*, he says, attracted him like so many beautiful slaves, he yet aimed higher, to embrace the mistress of them all—Philosophy. Metaphysical investigation was the only thing which, according to his own confession, could give him satisfaction or pleasure. The extraordinary brilliancy of his style, which, by his contemporaries, was likened to that of Plato—his rare power of thought and imagination, with an erudition which displayed the most astonishing familiarity with all the works of the classical Greek poets and philosophers, while it made him an adept in history, geography, mathematics, astronomy, physiology, natural history, music, etc.—could not but be of vast influence both upon his co-religionists and those beyond the pale of his ancestral Jewish creed. He had completely mastered the literature of his nation; but, strange to say, he knew it, as far as it was Hebrew, chiefly from translations. Thus, the Bible was familiar to him through only the Septuagint version, with all its deficiencies. When about 40 years of age, he went to Rome as the advocate of his Alexandrian brethren, who had refused to worship Emperor Caligula in obedience to the imperial edict; of which embassy he has left an account. Of his life we know little except what is recorded above, and that he went once to Jerusalem. His second mission to Rome, to Emperor Claudius, on which occasion he is said to have made the acquaintance of the apostle Peter, as reported by Eusebius, rests on a legend of no historic value.

The religious and philosophical system of P., really the thing of consequence, is minutely known, and is deserving of profound study, on account of the vast influence which it has exercised both on the Jewish and on the Christian world. To understand his system aright, it is necessary to remember the strange mental atmosphere of his days; for a brief sketch of which, see GNOSTICS. The Alexandrines had endeavored to make Judaism palatable to the refined Greeks, by proving it identical with the grandest conceptions of their philosophers and poets, and had quite allegorized away its distinctive characteristics. P. was the first man who, though himself to a great extent imbued with allegorizing tendencies, made a bold and successful stand against this evaporization of the revealed religion of his fathers, which had led many Jews to throw off its yoke also outwardly. A most zealous champion of Judaism, his bitterness knows no bounds in rebuking those co-religionists who tried to defend their secret or overt apostasy by scoffing at the Law itself, who were 'impatient of their religious institutions, ever on the look-out for matter of censure and complaint against the laws of religion, who, in excuse of their ungodliness, thoughtlessly argue all manner of objections.' He cannot understand how Jews, 'destined by Divine authority to be the priests and prophets for all mankind,' could be found so utterly blind to the fact, that that which is the position only of a few disciples of a truly genuine philosophy—viz., the knowledge of the Highest One—had by law and custom become the inheritance of every individual of their own people; whose real calling, in fact, it was to invoke and to bring the blessing of God on all mankind, and who, when they offered up sacrifices 'for the people,' offered them up in reality for all men.

To P., the divinity of the Jewish Law is the basis and test of all true philosophy. Although, like his contemporaries, he holds that the greater part of the Pentateuch, both in its historical and in its legal portions, may be explained allegorically; and goes so far even as to call only the Ten Commandments, the fundamental rules of the Jewish theocracy, direct and immediate revelations from above, while the other parts of the book are to be ascribed to Moses—he yet holds Moses to be the interpreter specially selected by God, to whose dicta so far also Divine veneration and strict obedience are due; and again, that though many explanations of a metaphysical nature could be given to single passages, yet their literal meaning must not be tampered with. This literal meaning, according to him, is the essential part, the other explanations are mere allowable speculation—exactly as the Midrash and some church Fathers hold. Only his allegorical method differed so far from that of his contemporaries, that to him these interpretations—in which he did not disdain sometimes even to use the numbers symbolically, or to derive Hebrew words from Greek roots, and the like—were not a mere play of fancy, but to a certain extent a reality, an inner necessity. He clung to philosophy, as combined with the Law. If the former could be shown in one way or another to be hinted at in the latter, then only he could be that which all his soul yearned to be—viz., the disciple of both: a Greek, with all the refinement of Greek culture; and a Jew—a faithful, pious, religious Jew. He even urged the necessity of allegory from the twofold reason of the anthropomorphisms current in Scripture, and from certain apparent superfluities, repetitions, and the like, which, in a record that emanated from the Deity, must needs have a special meaning of their own, which required investigation and a peculiar interpretation. See MIDRASH: HAGGADA. Yet this fanciful method never for one moment interfered with his real object of pointing out how Judaism plainly and unmistakably was based upon the highest ethical principles.

His writings develop his ideas and his system in the two directions above indicated. In that division of his writings, principally, which treats of the Creation (*Kosmopoia*), he allows allegory to take the reins out of his hands; but in that on the Laws (*Nomoi*), he remains remarkably sober and clear, extolling the Mosaic legislation throughout, at the expense of every other known to him. In a very few instances only he is induced to find any fault, or to alter slightly by way of allegory the existing ordinances.

His idea of God is pre-eminently religious, not philosophical. God alone is the real Good, the Perfect; the world has only an apparent existence, and is the source of all evil. God is to be imagined only as the primeval light, which cannot be seen as itself, but which may be known from its rays that fill the whole world. Being infinite and uncreated, He is not to be compared with any created thing. He has therefore no name, and reveals Himself only in designations expressive of this 'inexpressibility.' He is named also the Place (the talmudical *Makom*), because He comprises all space, and there is nothing anywhere besides Him. He is better than Virtue and Knowledge, better than the Beautiful and the Good (*Kalokagatheia*), simpler than the One, more blissful than bliss. Thus, he has, properly speaking, no quality, or qualities only negatively. He is the existing Unity or Existence itself (*On*, or *Ŏn*), comprised in the unpronounceable Tetragrammaton. As Creator, God manifests Himself to man, and He so doing is called 'the Beginning, the Name, the Word, the Primeval Angel.' In this phase of active revelation of God, which is as natural to Him as burning is to the heat, and cold to the snow, are observed two distinct sides, the Power and the Grace, to which correspond the two names Elohim and Adonai, used in the Bible. The *Power* also gives the laws, and punishes the offender; while the *Grace* is the beneficent, forgiving, merciful quality. Yet, since there is not to be assumed an immediate influence of God on the world—His infinite Essence being so different from the world's nature that a point of contact of the two cannot be found—an intermediate class of beings had to be created to stand between both, through whom He could act in and upon creation—viz., the spiritual world of ideas, which are not only 'ideals' or types in the Platonic sense, but are real, active Powers, surrounding God like a number of attendant Beings. They are His messengers, who work His will, and by the Greeks are called good demons (spirits); by Moses, angels. There are very many different degrees of perfection among them. Some are immediate 'serving angels,' others are the souls of the pious, of the prophets, and the people of Israel, who rise higher toward the Deity; others, again, are the heads and chief representatives of the different nations, not needed to mediate the presence of God to the people of Israel, since they have been taught and enabled to conceive and acknowledge the Everlasting Head of all beings, Himself. The

Logos comprises all these intermediate spiritual powers in His own essence. For P.'s views on this part of his system, which has been much discussed, see LOGOS. Man is a microcosm, a little world in himself, a creation of Logos, through whom he naturally participates in the Deity; or, as Scripture has it, 'he is created in the image of God.' Man stands between the higher and lower beings—in the middle of creation. The ethical principles of stoicism, P. identified with the Mosaic ethics, in which the ideal of character is the most exalted moral perfectibility or sanctity, and in which man's duties consist in veneration of God and love and righteousness toward fellow-men. P. holds firmly the belief in man's immortality. Man is immortal by his heavenly nature; but as there are degrees in his Divine nature, so there are degrees in his immortality, which deserves this name only when it has been acquired by an eminence of virtue. There is a vast difference between the mere existence after death, which is common to all mankind, and the future *life* of the perfect ones. Future recompense and punishment are not taken by P. in the ordinary sense of the word. Virtue and sin both have all their rewards within themselves; but the soul, which is 'pre-existing,' having finished its course in the sub-lunar world, carries this consciousness with it in a more intense and exalted manner. Paradise is Oneness with God; there is in the Philonic system no hell with bodily punishments for souls without a body, and no Devil.—Philo's Messianic notions are vague in the extreme, and he partly even interprets certain scriptural passages alluding to some future Redeemer as referring to the soul. Yet he indicates his belief in a distant time when some hero will arise out of the midst of the Jewish nation, who will gather together all the dispersed; and these, purified by long punishments, will thenceforth form a happy, sinless, most prosperous community, with which all the other nations will be eager to unite.

The above indicates in the slightest of outlines the principal features of P.'s theology and philosophy, without endeavoring to follow any one of the manifold systematic schemes into which his scattered half-obscure dicta have been pressed. The influence of P. on Christianity and Judaism (in whose later writings his name occurs as 'Yedidyah the Alexandrine') is enormous: see various titles (GNOSTICS: JEWS: LOGOS: ETC.). For what he has done in the development of philosophy, see PHILOSOPHY: PLATO: NEO-PLATONISM: ETC. Of the many works left under his name, several have been declared spurious, but in some cases with little show of reason. His writings are generally brought under three chief divisions, the first comprising those of a more general and metaphysical nature, e.g., *De Mundi Incorruptibilitate, Quod Omnis Probus Liber, De Vita Contemplativa.* The second contains those in defense of his compatriots, *Adversus Flaccum,Legatio ad Caium, De Nobilitate.* The third and most important deals with the interpretation and explanation of Scripture in the philosophical manner indicated, *De Mundi Opificio*, *Legis Allegoriarum Libri III.;* containing also a number of special treatises, *De Circumcisione*, *De Monarchia*, *De Præmiis Sacerdotum*, *De Posteritate Caini*, *De Cherubim*, etc.; five books *On the History of Abraham*, *De Josepho*, *Vita Mosis*, *De Caritate*, *De Pœnitentia*, etc.; to which also belong *De Parentibus Colendis*, *De Virtute eiusque Partibus*, published first by Cardinal Mai; and certain very doubtful fragments, discovered first in an Armenian translation, e.g., *De Providentia*, *De Animalibus*, etc. Many of his works, however, seem irredeemably lost. The *editio princeps*, by Turnebus, dates Paris 1552; reprinted Geneva 1613; Paris 1640; etc. Mangey published a more critical ed. (Lond. 1742 in 2 vols. fol.), and Richter a slightly improved one (Leip. 1828–30 in 8 vols.). An ed. of Pfeiffer (1785, etc.) remained incomplete. Another ed. was published by Tauchnitz (1851, etc.). As yet, there are several codices in the Escurial, in Rome, in St. Petersburg, which have never been collated, and which promise, to judge from the few readings known, to furnish an immense help for that really critical edition which as yet is a desideratum.—Among the scholars who have written on P. are Dahl, Bryant, Gfrörer, Creuzer, Grossmann, Wolff, Ritter, Beer, etc. The Eng. transl. of P., 4 vols., forms part of Bohn's *Ecclesiastical Library.*

PHILOLOGY, n. *fĭl-ŏl′ŏ-jĭ* [Gr. *philologĭa*, the love of disputing, the love of literature—from *philos*, loved; *logos*, a word, discourse]: science of words and language; all studies immediately connected with words and language, applied thus to ethnography and history in their linguistic relations, but applied directly to etymology and grammar. PHILOLOGICAL, a. *fĭl′ō-lŏj′ĭ-kăl*, pertaining to or connected with philology. PHIL′OLOG′ICALLY, ad. *-lĭ*. PHILOLOGER, n. *fĭl-ŏl′ŏ-jėr*, or PHILOL′OGIST, n. *-jĭst*, one versed in philology.—*Philology*, as a technical name for a branch of knowledge, has passed through various phases of meaning. Signifying originally the love of talk or discourse, then, in a more restricted sense, the love of philosophical conversation such as is exhibited in the dialogues of Plato, P. came, in later Greek literature, to mean the study and knowledge of books, and of the history and other science contained in them. In this sense it passed over to the Romans, under whom the name of philologists was applied to men distinguished for universal learning, more especially to the *Grammatici*, whose chief occupation of editing and illustrating the classic poets naturally led them to this multifarious knowledge; and when Martianus Capella (q.v.) in the 5th c. composed his Encyclopedia (q.v.) or curriculum of education, embracing the 'seven liberal arts' (Grammar, Dialectic, Rhetoric, Music, Arithmetic, Geometry, and Astronomy), he designates the collective whole by the name of philology. What is known as the Revival of Literature after the dark ages is nothing else than the revival of the ancient P. But when men, instead of looking only at what had been written, began to examine the world for themselves, and enlarge the bounds of science, it became impossible for one man to cultivate the whole round of knowledge, and the term P. was by degrees restricted to a knowledge of the languages, history, laws, etc., of the ancient world (by which the Greek and Roman world chiefly was thought of), or more narrowly still, to the study merely of the languages—of grammar, criticism, and interpretation. A more complete conception of P., as an independent branch of knowledge, was that of F. A. Wolf, who assigned as its field all that belongs to the life of the ancient peoples; and the conception is still further extended by Böckh, who makes it almost synonymous with history—its problem being the reproduction of the past; in this sense, the word is applicable to all peoples at all periods of their history, so that we are beginning to have an Indian P., a German P., a Slavic P., no less than a classic P. The fullest and most systematic exposition of what P. in this sense ought to embrace, has been given by G. Haase in Ersch and Grüber's *Encyc.*, 3d sec., XXIII. The following is an instructive outline by Prof. W. D. Whitney of Yale Univ., in *Encyc. Brit.*, 9th ed.: 'How and for what purposes to investigate the literature of any people (philology in the more proper sense), combining the knowledge thus obtained with that derived from other sources; how to study and set forth the material and structure and combinations of a language (grammar), or of a body of related languages (comparative grammar); how to co-ordinate and interpret the general phenomena of language, as variously illustrated in the infinitely varying facts of different tongues, so as to exhibit its nature as a factor in human history, and its methods of life and growth (linguistic science)—these are what philology teaches.'—See titles of various countries and races, with their literature and dialects.

Of P., even in its widest sense, the study of language was always, and necessarily, a fundamental part; and, in the usual sense of the word, it has been the chief part —often nearly the whole. For a long time after the revival of learning, the classic writers were studied chiefly for their language and style, and those of them that did not meet an imaginary standard of purity were despised and neglected, however valuable they might be for their matter. But though great and even undue attention was thus given to language, it was only as an instrument, as means to an end. The philologist studied a language in order to be able to understand it and use it—to get at the thoughts conveyed in it, or to convey his own thoughts with force and elegance to others. This is the object of the grammars, dictionaries, annotated editions, and criticisms, which constitute the chief part of philological literature. But within recent years, P. has entered on a new phase, or rather a new field of study has been added to the old. As the naturalist investigates a class of objects not with a view to turn them to use, but to understand their nature, and classify them, so the modern school of philologists examine and compare the structures of the various languages, and arrange them in classes and families, with the ultimate view of arriving at some theory of language in general—its mode of origin and growth. The comparison of the structure of two or more languages is called Comparative Grammar, and the whole of this new branch of study is sometimes designated Comparative P.; but it seems better to leave the old field in possession of the old name, and in distinction from P., as the practical knowledge of languages, to speak of the study of language as a phenomenon *per se*, as the Science of Language. The German term *Sprachenkunde*, and the French *Linguistique*, have more especial reference to the naturalist or classificatory aspect of the study.

So long as the view prevailed that language was a human invention, anything like a science of it was impossible. According to that view, early started, and elaborated and discussed especially by Locke, Adam Smith, and Dugald Stewart, it was only after men found that their rapidly increasing ideas could be no longer conveyed by gestures of the body, and changes of the countenance, that they set about inventing a system of artificial vocal signs, whose meaning was fixed by mutual agreement. On this theory, there might be a history of the subsequent course of the different languages, but inquiries into the nature and laws of language after the manner of the physical sciences would be absurd. In opposition to the philosophers who attributed the origin of language to human invention, some theologians claimed a Divine origin for it, representing the Deity as having created the names of things, and directly taught them to Adam. Both these theories may now be considered as given up by all who are entitled to speak on the subject. Everything, in fact, tends to show that language is a spontaneous product of human nature—a necessary result of man's physical and mental constitution (including his social instincts), as natural to him as to walk, eat, or sleep, and as independent of his will as his stature or the color of his hair.

Language was an object of speculation among the Greek philosophers; but as was the case with their inquiries into the outward world generally, they began at the wrong end; they speculated on the origin of things before they had examined the things themselves. They knew no language but their own, and all others were indiscriminately classed as 'barbarous' or foreign; they had no test of affinity among tongues except mutual intelligibility. The theories of the modern philosophers of the 18th c. were nearly as baseless; they were mere *a priori* speculations, akin to Burnet's (q.v.) 'theory of the earth'—a theory constructed before the strata of the earth's crust had been explored. The great obstruction to the true course of inquiry was the assumption, made first by the church Fathers, and for a long time unquestioned, that Hebrew was the primitive language of man, and that therefore all languages must be derived from Hebrew. A prodigious amount of learning and labor was wasted during the 17th and 18th c. in trying to trace this imaginary connection. Leibnitz was the first to set aside this notion, and to establish the principle that the study of languages must be conducted in the same way as that of the exact sciences, by first collecting as many facts as possible, and then proceeding by inductive reasoning. It was owing to his appeals and exertions that missionaries, travellers, and others, began to make those collections of vocabularies and specimens of languages and dialects which form the *Herbarium*, as it were, of human speech. A valuable Catalogue of Languages, six vols., in Spanish, was published 1800 by Hervas, Jesuit missionary: it contains specimens and notices of more than 300 languages, and many of the true affinities are happily traced. A similar work was Adelung's *Mithridates* (4 vols. Berlin 1806–17), based on the catalogue of Hervas, also on the collections which the Russian govt. had caused to be made. In none of these efforts, however, though much truth was brought out, were there any fixed principles of scientific classification. The light that brought order into the chaos rose with the study of Sanskrit (q.v.), made accessible to European scholars first by Sir William Jones, Colebrooke, and other members of the Asiatic Soc., founded Calcutta 1784. The similarity of Sanskrit to Greek and Latin, especially in the grammatical forms, struck every one with surprise. Sir William Jones declared that 'no philologer could examine the Sanskrit, Greek, and Latin without believing them to have sprung from the same source, which perhaps no longer exists. There is a similar reason, though not quite so forcible, for supposing that both the Gothic and the Celtic had the same origin with the Sanskrit. The old Persian may be added to the same family.' Rather than admit this relation, which it was seen would involve also ethnological affinities, some, as Dugald Stewart, denied that Sanskrit had ever been the language of a people, and held that it was an invention of the Brahmans, who had constructed it on the model of the Greek and Latin. Fr. Schlegel's work, *On the Language and Wisdom of the Indians* (1808), though defective and erroneous in scholarship, had the merit of boldly embracing the languages of India, Persia, and Europe in one family group, by the comprehensive name Indo-Germanic. It was this work that called the attention of German scholars to a field of labor which they have since made specially their own.

The successive publications of Bopp (q.v.), beginning 1816, culminating in his great work on the grammar of the Aryan languages, *Vergleichende Grammatik* (Berl. 1833–52; 2d ed., recast and enlarged, 3 vols. Berl. 1857; Eng. transl. of 1st ed., 3 vols. 1845–50, revised 1854), were actually epoch-making: they created the new science of Comparative Grammar and laid a sure and broad foundation for a science of language generally. Concurrent with the labors of Bopp were those of Pott in his Etymological Researches (*Etymologische Forschungen*, 2 vols., 1833–36; 2d ed. 1859) and other works. Not less important, though confined to one stock of the Aryan family, the Teutonic, was the great German Grammar (*Deutsche Grammatik*, 4 vols. 1818–37) of J. Grimm (q.v.). William von Humboldt (q.v.) did much to establish a philosophy of language—the relations and interactions of mind and speech; a department of the subject further cultivated in recent years by Steinthal. The method of investigation, thus invented and perfected in the field of the Aryan tongues, has been applied to other languages, and considerable progress has been made in grouping the principal varieties of human speech into families, which again fall into sub-divisions or branches, according to the different degrees of nearness in the relationship. In establishing these relationships, though a comparison of the vocabularies—the numerals, pronouns, and more essential nouns and verbs—may establish a general affinity, and render a common origin probable, yet the surer test is in the grammatical forms. For when those elements of a language which express the relations of things—case, number, tense—have once become mere terminations, and lost their original form and independent meaning, they can be transmitted only by tradition; and when the same grammatical forms are found possessed in common by two or more tongues, they must be an inheritance from a common ancestor. It follows from this that the 'genealogical' classification, as it is called, cannot be carried out with great surety or rigor except in the case of languages in which grammatical forms had become in some degree fixed before their divergence—i.e., except in the case of the inflectional languages. Accordingly, the only two well-defined genealogical families are the Aryan and the Semitic, which embrace all the languages of the inflectional type.

Besides the division of languages into families bearing traces of a common origin, there is a division into three orders, as they may be called, depending on radical difference of structure. Speech, as the expression of thought, contains two elements: ideas or conceptions, which constitute the substance or material part; and the relations of these ideas to one another, which constitute the formal part; and the nature of a language depends on the particular way in which the vocal expression of these two elements is combined. At the foundation of all words lie Roots (q.v.), or simple sounds expressive of meaning. Now, some languages, e.g., the Chinese (q.v.), use these roots in their naked form as words, the same syllable, according to its position, serving as noun, adjective, verb, etc.—e.g., *ta* means great, greatness, to be or to make great, greatly or very. The relational part of the thought mostly gets no vocal expression; it is only indicated by position, as when *min*, people, and *li*, power, are simply put together (*min li*) to signify the people's power. Relations not readily indicated by position are expressed in a round-about way by using additional significant words: thus, *tschung* (mass or multitude) *jin* (man) = men; *niu* (woman) *tsè* (child) = daughter; *y min li* (employ people power) = with the people's power. Even in such cases, each root preserves its independence, and is felt to express its own radical meaning. Languages like the Chinese, whose development has been arrested at this rudimentary stage, are called *Monosyllabic* or *Isolating*.

The next stage of development is that of the *Agglutinate* languages, by far the most numerous, including the Turanian and American families. In these, the relational part of thought obtains prominent vocal expression by separate roots joined or *glued* on to the significant roots as terminations. These terminations were originally themselves significant roots, and many of them are used still as separate significant words, though the greater part have sunk down to mere signs of cases and other relations. The compound expression thus formed never, however, attains perfect unity; the significant root always remains rigid, unobscured in its sense, and unchanged in form, and the termination is felt as something distinct from the body of the word.

Thus, the Finnish declension exhibits a structure of the most mechanical and transparent kind—e.g., *karhu*, bear; *karhu-n*, of the bear; *karhut-ta*, without bear; *karhu-sta*, out of the bear; and so on through 15 cases. The insertion of the plural suffix, *i*, gives *karhu-i-n*, of the bears; *karhu-i-ta*, without bears; *karhu-i-sta*, out of the bears; etc. But this composite mechanical structure reaches its climax—remaining all the while perfectly transparent—in the Turkish verb. Thus, the root *sev* has the indefinite meaning of loving, and the inf. is *sevmek*, to love; which then, by the insertion of certain suffixes, can take on as many as 40 forms or voices—e.g., *sev-me-mek*, not to love; *sev-e-me-mek*, not to be able to love; *sev-dir-mek*, to cause to love; *sev-dir-ish-mek*, to cause one another to love; *sev-il-mek*, to be loved; *sev-il-e-me-mek*, not to be able to be loved; etc. Each of these forms, then, runs through a large round of tenses and moods, with their persons and numbers.

The languages of the American Indians all are of this agglutinating type, though they have got also the name Incorporative or Intercalative, because they run a whole phrase or sentence into one word—e.g., *hoponi*, to wash; *hopocuni*, to wash hands; *hopoaduni*, to wash feet; *ninacaqua*, I (*ni*) eat (*qua*) flesh (*naca*). The Basque language partakes of this character.

It is only in the third or *Inflectional* stage that perfect unity of the two elements is attained. In the Aryan and Semitic tongues, which alone have reached this highest state of development, the significant root and the termination have become blended into one both in effect and form, and phonetic changes have mostly obliterated the traces of composition. Yet no doubt is felt by philologists that the most highly organized of the inflecting or amalgamating languages began with the radical stage, and passed through the agglutinate. The analytic powers of comparative grammar have succeeded in tracing back the formal elements of the Aryan tongues to original independent words, agglutinated to other words to modify them: see INFLECTION. Against this theory it has been urged that there is no historical instance of a language so changing its type, and passing from one stage to another. But a sufficient account of this phenomenon may be found in the different mental habits and political positions of the peoples (see Max Müller, *Lectures on the Science of Language*, First Series, 316). Besides, the languages of the lower types do show a tendency, under favorable circumstances, to produce grammatical forms of the higher kind. Even in Chinese, in some of its modern dialects, something like cases is seen; and Finnish and Turkish, in contact with the inflected languages of Europe, are making approaches to the inflectional type.

On the other hand, the inflectional languages had, before the earliest times of which we have any written monuments, entered on the reverse phase—the *analytic*. By the process of phonetic change and decay, the grammatical forms have been gradually becoming obliterated and losing their power, and their place has been supplied by separate words in the shape of prepositions and auxiliary verbs: see INFLECTION.

Connected with these radical differences of type is one of the higher and more speculative problems of the science—the question as to the common origin of all languages. The inherent and apparently ineffaceable difference of structure in the three orders above described, as well as the absence of all sure marks of genealogical affinity even between the two families of the inflectional type, the Aryan and the Semitic, are considered by some as insuperable objections to the theory of a common origin. But though it may be fruitless to look for extensive identifications of the roots and grammatical forms of the Aryan tongues, even in the oldest forms to which we can trace them, with those of the Semitic, still more with Chinese or Turkish elements, it seems rash and unscientific to affirm that, going back to the radical stage, the development of all could not have begun from a common stock of monosyllabic roots. The wonderful transformations exhibited by language in the course of its known history seem sufficient ground for maintaining the *possibility* of origin in a common stock. On the other hand, the nature of the case forbids hope of ever being able to *prove* it; for the coincidences that occur (e.g., Chinese *fu*, Tibetan *pha*, Lat. and Gr. *pa*-ter, Eng. *fa*-ther; Chin. *mu*, Egyp. *mu*, Lat. and Gr. *ma*-ter, Eng. *mo*-ther) might arise from the mind and vocal organs of man being everywhere essentially the same.

Languages, like living organisms, are in a state of continual flux, and an essential part of the science consists in investigating the laws according to which these changes take place. It is because there are such laws that a science of language is possible. In tracing words to their origin, and identifying them with words in other languages, we are guided no longer by mere similarity of sound; on the contrary, identity of sound is often a proof that a proposed etymology is wrong. It has been established, e.g., by induction (see GRIMM'S LAW), that *c* in Latin is regularly represented by *h* in Gothic and English; while for Gothic or English *c*, the corresponding letter in Latin is *g*. Accordingly, we readily recognize Lat. *corn-u* and Eng. *horn* as cognate words; while a suggestion to connect the Eng. *corn* with Lat. *cornu* is immediately rejected. If *corn* has a representative in Latin, it must begin with *g*, which points out *granum* as the word. *Grain* is not the Eng. representative of *granum;* it *is* granum, borrowed from the Latin through the French. The expert etymologist can often identify with certainty two words, though not a letter remains the same. In simple cases, this is done by every one. Who, for instance, doubts that Aberdeenshire *fa*, *filk*, are merely dialectic varieties of Eng. *who*, *which?* Yet the same persons who readily admit such cases are skeptical when it is proposed, for instance, to identify Fr. *larme* with Eng. *tear*. The grounds of identification, however, are similar in both instances; the only difference being that, with regard to *larme* and *tear*, they require to be traced historically. No one will dispute that *larme* is a corruption of Lat. *lacrima;* in fact, it can be followed through the successive stages of change. Now we know that the Romans had a peculiarity of letting *d* in some positions degenerate into *l*. Nor is this unaccountable, when we consider that the contact of organs which produces *d* differs from that which produces *l* chiefly in being more energetic; a slovenly *d* slides into *l*. Thus the Greek name Odysseus became in the mouth of the Romans Ulysses; they said *odor* (a smell), but *oleo* (I smell); and, instead of *impedimentum, dedicare*, we sometimes find *impelimentum*, *delicare*. These and other instances would warrant us to conclude that *lacri-ma* was a corruption of *dacri-ma* (corresponding to Gr. *dakru*), even if we had not the express statement of Festus that *dacrima* was the older form. After this there is no difficulty in recognizing *dacri*, or *dakru*, as identical with Gothic *tagr*, Eng. *tear*.

In order to give a rational account of the phonetic changes now exemplified, the nature of articulate sounds, and of the organs that produce them, must be carefully investigated. The most valuable contributions, in English, to this important preliminary branch of the study (called *Phonetics*), are those of Alexander J. Ellis, and of Melville Bell, in his book *Visible Speech:* see PHONETIC WRITING: VISIBLE SPEECH. A *résumé* of the subject, with diagrams of the organs of voice in the position of pronouncing the different articulations, is given in the second series of Max Müller's *Lectures on the Science of Language*.

The transformations that words exhibit, as they are traced down the stream of history, are of the nature of phonetic decay, and are due to a natural tendency to economize muscular exertion by pronouncing two syllables in one. The dropping of inflections, the shortening of words by internal elision and otherwise (Fr. *père*, from Lat. *pater;* Eng. *fair*, from AS. *fæger; stranger*, from old Fr. *estrangier*, Lat. *extraneus*), all are due to the action of this force; and the uniformities observable among such changes can be explained on physiological principles. Dialectic diversification is not so easily accounted for; it is difficult to say why sister nations—as in the case of the Aryan family, or of the nations speaking Romanic tongues—should have given such different forms to the same stock of primitive roots; why, e.g., Gr. *pente* (Æol. *pempe*), *pepo*, should be in Lat. *quinque*, *coquo*. Max Müller thinks it necessary to go back to a time when many of the articulations were not yet sharply defined; and he appeals, in illustration, to the confusion children make between such sounds as *tat* and *cat;* and, what is still more in point, to the analogy presented by languages like the Polynesian. In the language of the Sandwich Islands, the two consonants *k* and *t* run into one another, 'and it seems impossible for a foreigner to say whether what he hears is a guttural or a dental. The same word is written by Prot. missionaries with *k*, by French with *t*. It takes months of patient labor to teach a Hawaiian youth the difference between *k* and *t*, *g* and *d*, *l* and *r*. . . . If colonies started to-morrow from the Hawaiian Islands, the same which took place thousands of years ago, when the Hindus, the Greeks, and Romans left their common home (see ARYAN), would take place again. One colony would elaborate the indistinct, half-guttural, half-dental contact into a pure guttural; another, into a pure dental; a third, into a labial.' Much light is thrown on this question by those phonetic peculiarities—those deficiencies and predilections of articulation—which characterize whole tribes and nations, as they often do individuals. They may have originated, perhaps, in the idiosyncrasies of individual ancestors (a lisping patriarch might produce a tribe of lispers, without their inheriting the physical defect which caused the lisp in him), or in a common habit of the organs of speech produced by external circumstances; but once established, they are very persistent and influential. The Mohawks, and several other American tribes, have no *p*, *b*, *m*, *f*, *v*, or *w;* they never articulate with their lips. In Chinese, there is no *d; r* also is lacking; and as the habit of the language requires a vowel after every consonant, the nearest approach that they can make to the sound of *Christ* is *Ki-li-se-tu.* An analogous habit of articulation transforms the English word *gold* in the mouth of a Kafir into *i-go-li-de.* On this principle can be explained the Fr. *espérer*, from Lat. *sperare; establir* or *établir*, from *stabilire; école* (*escole*), from *schola*, etc. In the Celtic tongue, an initial *s* with a consonant after it was an unwonted combination; when it would have occurred, a vowel was always prefixed; and, on adopting the Latin language, the Celtic peoples carried their old habit of pronunciation with them. The effects on a language of such contact with another are important elements in its history. See ENGLISH LANGUAGE: ENGLISH LITERATURE.

The positive part of the science of language, having pushed inquiry back until it arrives at monosyllabic roots that admit no further analysis, there stops as at the legitimate boundary of its province. It assumes the existence of a certain store of crude or primary matter, and merely concerns itself with how out of this matter the structure, as we know it, has been built or has grown up. But a question remains, which, though it can never receive other than a conjectural answer, has wonderful fascination for the speculative mind, and was in fact the question with which all inquiries into language began; the question, namely: How did language take a beginning at all? How came this primitive material of language, these significant roots, into existence? The answer may be thus conceived: To speak is a necessity of man's rational and emotional nature; he speaks because he thinks and feels, and is necessarily associated with others who think and feel. When the mind receives an impression or intuition, by an instinctive impulse, of the nature of reflex action, some outward expression—a gesture or vocal sound—breaks forth, which by association becomes a sign or symbol, to the individual and to his associates, of the impression or idea that gave it birth. Associated at first with individual impressions and objects, these sounds, by the process of abstraction, which is pre-eminently a human faculty, would gradually come to represent more generalized impressions—would become words, as distinguished from mere animal sounds. The necessity of words to think in is much insisted on by speculators on this subject, as being the motive-power in the generation of language; and no doubt it is true that, without language, thought could advance but little, if at all, beyond what is manifested by the brutes. But when they argue as if this necessity of having a man's ideas objectively depicted, in order to exercise his own reason, would impel an individual man to construct a language for his own use, they make the unwarranted assumption that, under any circumstances, even though he grew up from infancy in solitude, the thinking powers of a human being must necessarily develop themselves. The necessarily few facts that bear on the case look the other way. Kaspar Hauser (q.v.), instead of elaborating a system of symbols of thought for himself, had forgotten what he had once possessed; his faculties both of thought and of speech seem to have been simultaneously arrested. Observation seems to favor the opinion, that man in solitude—if he could exist in solitude—would be as mute as the lower animals. The social nature of man helped to give birth to the germs of speech, no less than his rational nature; an instinctive desire to give a sensible sign of his impressions to his fellows was perhaps the primary impulse; the aid thus given to his own thinking powers, a secondary result. Be this as it may, it seems reasonable to assume, as it has been well put by Steinthal, that 'at the origin of humanity, the soul and the body were in such mutual dependence, that all the emotions of the soul had their echo in the body, principally in the organs of respiration and the voice. This sympathy of soul and body, still found in the infant and the savage, was intimate and fruitful in the primitive man; each intuition woke in him an accent or a sound.'—Farrar, *Origin of Language.*

Were these sounds, then, guided by chance or caprice? or if not, what determined particular articulations to be associated with particular objects or ideas? Any mystic innate correspondence between sounds and things is out of the question; but what more reasonable than to suppose that the natural sounds emitted by so many things animate and inanimate, should suggest the character of the articulations which the ideas of the things called forth—not so as to produce exact imitations, which it is not of the nature of articulate sounds to be, but such resemblances as would suffice for association? See Onomatopœia. In the case of ideas unconnected with any natural sound, names would readily be suggested in many cases by analogies real or fancied with things that were attended by sounds. We can see, again, a physiological fitness in the articulation *sta*, to stand, with the idea of stability; with the attitude, the organs involuntarily assume the position with which this syllable is emitted. Similar instances might be multiplied. We are not to suppose that the same thing would suggest the same sound to all, or even to the same individual at all times. The language-making faculty in the flush of its spring would throw out a multitude of names for the same thing (synonyms), as well as apply the same name to many different things (homonyms); but by a process of natural elimination, those only would survive that were felt best to answer the purposes of speech. The abstracting faculty would also soon dissociate them from the concrete individual objects that first suggested them, and convert them into symbols of the prominent attributes of whole classes. It is these generalized names, syllables significant of such general simple notions as seeing, moving, running, shining, striking, cutting, or being sharp, that, by a kind of inverse process, became the roots of language as it now exists. A syllable expressive of a single prominent attribute forms the foundation of the names of a whole class of objects, the specific differences being marked by other significant syllables joined on to it: see Root. In some such way, by the unconscious working of man's intellectual nature, we may conceive language to have grown out of the exclamatory or interjectional stage into the rational structure that we now admire. This theory of the origin of roots, together with the constant operation of phonetic change, accounts for the absence of all traces of onomatopœia in the great bulk of the words of a language, and seems to meet the objections of Max Müller and other philologists to the onomatopœic theory.

With regard to these primary or radical words it is necessary to observe here only that they all are significant of sensible or physical ideas, and that expressions for immaterial conceptions are derived from them by metaphor. For the growth, from a comparatively few roots of this kind, of the vocabulary of the richest language, see, further, Root.

Another speculative question regards the length of time that language must have taken to advance from the rudimentary stage to the state in which it is found in the earliest records. Bunsen assigns 20,000 years as the lowest limit; but the same uncertainty must rest on this question as on the corresponding one in geology.

For separate points of philology, see a variety of titles. See—besides the titles above referred to—Alphabet: the several letters, A, B, etc.: Genitive: Noun: Adverb: Pronoun: Dialect: Persian Language and Literature: Shemitic Languages: etc.

PHILOLOGY.

The literature of the new science of language is already rich; but much of it is scattered through the transactions of societies and periodicals. Of separate works of comprehensive kind, in addition to those above named, consult, in German, Schleicher, *Die Sprachen Europas* (Bonn 1850), and *Vergleichende Grammatik der Indo-Ger. Sprachen* (2 vols. Weimar 1861); J. Grimm, *Ueber den Ursprung der Sprache* (Ber. 1852); Diez, *Etymol. Wörterbuch der Romanischen Sprachen* (2d ed. Bonn 1861), and *Vergleichende Grammatik der Romanischen Sprachen* (3 vols. Bonn 1836–42), and Eng. transl. of both works, pub. by Williams and Norgate (1864); Heyse, *System der Sprachwissenschaft* (Ber. 1856); Steinthal, *Die Classification der Sprachen* (Ber. 1856); and *Der Ursprung der Sprache* (Ber. 1851). In French, Renan, *Histoire Générale et Système comparé des Langues Sémitiques* (3d ed. Paris 1863), and *De l'Origine du Langage* (3d ed. Paris 1863); Pictet, *Les Origines Indo-Européennes* (Paris 1859).

English scholars were late in entering this field of research. Horne Tooke's (q.v.) *Diversions of Purley*, though a work of genius, and the means of first awakening in many minds an interest in the nature of language, was written without sufficient acquaintance with the kindred tongues, and before the true key to the inquiry had been obtained: therefore few of its results can now be accepted. Among the first important contributions were Prichard's *Eastern Origin of the Celtic Nations* (Oxf. 1831), and the contributions of the Rev. Richard Garnett to the *Quarterly Review* 1835–48: these essays in the *Quarterly*, and subsequent papers by the same writer in the proceedings of the London Philological Soc. (in whose formation 1842 he was active), have been reprinted under the title *Philological Essays* (Williams and Norgate 1859), and are models of linguistic research. The philological articles of the *Penny Cyclopædia* also contributed to popularize the study in England. Of substantive works, the most important, though bearing more directly on the Greek and Latin tongues, are *The New Cratylus* (1839, 3d ed. 1859), and the *Varronianus* (1844) of J. W. Donaldson (q.v.). Winning's *Manual of Comparative Philology* (1838) had previously given a popular sketch of the affinities of the Aryan languages. Latham's *Elements of Comparative Philology* (1862) gives an elaborate classification of the languages of the world, with specimens; only a small part of the work is given to the general principles of the science. Farrar, *On the Origin of Language* (1860), deals chiefly with the speculative part of the subject; in *Chapters on Language* (new ed. 1873), he defends his original positions; his *Families of Speech* (new ed. 1873) deals with classification. The writings of Max Müller (*Comparative Mythology* in *Oxford Essays* 1856; *Lectures on the Science of Language*, 1861; second series 1864; new ed. of both 1871) went far to cause this science to take root in Britain and the United States. The principles of linguistic science are set forth in Whitney's *Language and the Study of Lan-*

guage (1868), and *The Life and Growth of Language* (1875). Other recent works are: Key's *Origin and Development of Language* (1874); and Sayce's *Principles of Comparative Philology.*

On the principles of classification above sketched, the chief languages of the earth may be thus arranged:

I. *Monosyllabic or Isolating.*—1. Chinese, the typical language of this order. 2. Tibetan, which shows some beginnings of grammatical forms. 3. The languages of the Eastern Peninsula—Siamese, Anamese, Burman. Japanese and the language of Corea are doubtful.

II. *Agglutinate.*—1. The most important division of this order is the Turanian family, comprising 'all languages spoken in Asia and Europe (including Oceania), and not included under the Aryan and Semitic families, with the exception of Chinese and its cognate dialects.' For the sub-divisions of this family, see TURANIAN LANGUAGES. 2. *African Languages.*—Some of the languages of Africa are allied to the Semitic family, and were introduced by immigration, e.g., the dialect of Tigré in Abyssinia (see ETHIOPIA), and the Arabic dialects spoken by the Mohammedan population of the coasts, and which have even penetrated deep into the interior. How far the Berber dialects are of Semitic character is a disputed question; and the same is the case with the language of the Gallas in Abyssinia. Little has yet been done in investigating and classifying the native Agglutinate languages of Africa, which have been designated by the common name Hamitic. The anc. Egyptian, from which the modern Coptic is derived, seems never to have grown beyond the isolating stage (see HIEROGLYPHICS). Some of the languages adjoining Egypt are thought to be allied to the Coptic. The negro languages, properly so called, of the Sudan, and of the w. coast from the Senegal to the Niger, are exceedingly numerous and widely diverse. The languages s. of the equator are markedly different from those north. They fall, according to some, into two great families, the Congo family on the w., the Kafir family on the e. The Hottentot language is distinct from both. A valuable contribution has recently been made to the study of part of the field by Bleek's *Comparative Grammar of the South African Languages* (1862). 3. *The Languages of the American Indians.*—The native languages of the new world are numbered by many hundreds, all differing totally in their vocabulary, yet agreeing in the peculiar grammatical structure which has given the name Incorporative (see above). Their area is contracting, and they seem destined to disappear.

III. *Inflectional.*—This order consists of two families, the Aryan and the Semitic, so distinct in their grammatical framework that it is impossible to imagine a language of the one family derived from one of the other. It is the peoples speaking these languages that have been the leaders of civilization within the historic period. The sub-divisions of these families are shown in the accompanying tables, from Max Müller's Lectures.

PHILOLOGY.

No. I.—Genealogical Table of the Aryan Family of Languages.

Living Languages.	Dead Languages.	Branches.	Classes.		
Dialects of India, The Gypsies,	Prakrit and Pali—Modern Sanskrit—Vedic Sanskrit		Indic	Southern Division	Aryan Family.
Persia, Afghanistan, Kurdistan, Bokhara, Armenia, Ossethi,	Parsi—Pahlavi—Cuneiform Inscriptions—Zend. Old Armenian		Iranic		
Wales, Brittany, +	Cornish	Cymric	Celtic	Northern Division	
Scotland, Ireland, Man,		Gadhelic			
Portugal, Spain, Provence, France, Italy, Walachia, The Grisons,	Langue d'oc Langue d'oil — Lingua vulgaris — Oscan Latin Umbrian		Italic		
Albania,			Illyric		
Greece,	Κοινή — Doric—Æolic Attic—Ionic		Hellenic		
Lithuania, + Courland & Livonia (Lettish),	Old Prussian	Lettic	Windic		
Bulgaria, Russia (Great, Little, White Russian), Illyria (Slovenian, Croatian, Servian),	Ecclesiastical Slavonic	Southeast Slavonic			
Poland, Bohemian (Slovakian), Lusatia,	Old Bohemian Polabian	West-Slavonic			
Germany,	Middle High-German Old High-German	High-German	Teutonic		
+ England, Holland, Friesland, North of Germany (Platt-Deutsch),	Gothic Anglo-Saxon Old Dutch Old Frisian Old Saxon	Low-German			
Denmark, Sweden, Norway, Iceland,	Old Norse	Scandinavian			

No. II.—Genealogical Table of the Semitic Family of Languages.

Living Languages.	Dead Languages.	Classes.	
Dialects of Arabic, Amharic, +	Ethiopic Himyaritic Inscriptions	Arabic or Southern	Semitic Family.
The Jews, + +	Biblical Hebrew Samaritan Pentateuch (3d c. A.D.) Carthaginian, Phœnician Inscriptions	Hebraic or Middle	
+ Neo-Syriac, +	Chaldee (Massorah, Talmud, Targum, Biblical Chaldee) Syriac (Peshito, 2d c. A.D.) Cuneiform Insc. Babylon, Nineveh	Aramaic or Northern	

PHILOMATH, n. *fĭl'ō-măth* [Gr. *philos*, loved; *man'thănō*, I learn]: a lover of learning. PHILOMATH'IC, a. *-măth'ĭk*, pertaining to the love of learning.

PHILOMEL, n. *fĭl'ō-mĕl*, or PHILOME'LA, n. *-mē'lă* [Gr. *Philomēla*, mythical daughter of King Pandion of Attica, who was changed into a nightingale, or, as some say, a swallow]: the nightingale. Modern poets are (or rather were, for it was chiefly an 18th-c. fashion) fond of calling the nightingale by this classic name.

PHILOPENA, *fĭl-ō-pē'nâ* [origin uncertain and orthography unsettled]: simple game or play of forfeit. A person in a party finding a two-kerneled almond, or other nut, presents one of the kernels to another person, keeping the other himself. Whichever one of the two persons either receives from the other's hand any object offered, or answers by yes or no a question put by the other, or at the next meeting of the two is not the first to say 'philopena,' or fails on any other test that has been agreed upon, must pay forfeit to the other. The word P. is used to denote also the salutation, also the kernel of the nut whose transfer is the first act in the play. As remarked above, the word P. is written in many ways—filopena, filipeen, phillipene, etc. One derivation of the word is from the proper names Philip, Philippine, supposed to be names given to each other by the two parties in the play, male and female. At least as probable is the derivation from Ger. *vielliebchen*, sweetheart, darling. An argument in favor of this derivation is, that the play appears to be of Ger. origin. The derivation of the word from the Greek, *phile poinē* (friendly penalty), is untenable.

PHILOPŒMEN, *fĭl-ō-pē'mĕn:* the most illustrious patriot and general in the later history of Greece: about B.C. 252—about B.C. 183; b. Megalopolis, in Arcadia; of one of the best families of Arcadia. At an early age he lost his father, and was brought up by a wealthy citizen, Cleander, who gave him an excellent education. His earliest experiences of war were in the border raids of the Arcadians into Laconia; but B.C. 222 he was one of the defenders of Megalopolis against Cleomenes, King of Sparta. Next year, when the Macedonian king Antigonus marched to assist the Achæans, P. joined him at the head of 1,000 horse, and contributed materially to the terrible defeat which the Spartan king received at Sellasia. As tranquillity was for a short time restored to Greece, P. went abroad to perfect himself in the art of war, and served in Crete with such distinction, that on his return to the Peloponnesus, B.C. 210, he was appointed gen. of the Achæan horse. In the expedition against Elis (209) he slew the Elean leader, Demophantus, with his own hand. In 208 he was raised to the highest military dignity then possible in Greece, being elected *strategus* or commander-in-chief of the Achæan League, and in this capacity signalized himself by great improvements in the drill, discipline, and armor of the Achæan soldiery. The ancient heroism of the land seemed to be reviving. The battle of Mantineia, in the same year, and in which the Spartans were again utterly routed—their gen. and king, Machanidas, falling by the sword of P. himself—raised P. to the pinnacle of fame; and at the Nemean festival which followed, he was proclaimed liberator of Greece. His exalted honors did not in the least disturb the integrity of his character. So great was his influence over his quarrelsome countrymen, that the Macedonian monarch, Philip, began to fear that Greece would regain its independence, and tried to have him secretly assassinated; but the infamous treachery was discovered in time, and its only effect was to endear P. still more to the Achæans. Another of his determined enemies was Nabis, successor of Machanidas in the 'tyranny' of Sparta; but B.C. 201 P. inflicted on him a severe defeat at Skotetas, on the borders of Laconia. During the next few years he was absent in Crete, partly, it seems, for political reasons; but returned to the Peloponnesus B.C. 194 to find matters in a serious condition. A new and dreaded power—the Romans—had appeared, and overthrown both Philip and Nabis; and P. foreboded future mischief to all Greece from these ambitious warriors. On the departure of the consul Flamininus, Nabis recommenced hostilities against the Achæans; P. was once again appointed strategus (192); and in a pitched battle nearly annihilated the troops of Nabis, who himself was shortly afterward killed by the Ætolians. P. now exerted all his power to heal the divisions among the Achæans, and to prevent them from affording the Romans a pretext for taking away their independence. In 188 he took a fierce revenge on Sparta for having put a number of his friends to death, and was in consequence strongly censured by the Roman senate, and by Q. Cæcilius Metellus, who was sent out as a commissioner to Greece B.C. 185. Two years later, P. (now an old man of 70) was elected strategus for the eighth time. When lying ill of a fever at Argos, news was brought to him that the Messenians had broken their connection with the league; P. instantly rose from his sick-bed, hastened at the head of some cavalry to quell the revolt, but was overpowered by numbers, and fell into the hands of Deinocrates, leader of the Messenians, who two nights afterward sent him a cup of poison, which P. drank and died. The remains of the hero were brought in solemn procession to his native city—the historian Polybius carrying the urn—and statues were erected to his memory by his grateful and repentant countrymen.

PHILOPROGENITIVENESS, n. *fĭl'ō-prō-jĕn'ĭ-tĭv-nĕs* [Gr. *philos*, loved; L. *progeniēs*, offspring]: in *phren.*, faculty common to man and the lower animals, whose chief function concerns the instinctive love of young—its organ in the brain is said to lie immediately above the middle part of the cerebellum.

PHILOSOPH′ICAL ANAT′OMY: comparative anatomy in the widest sense; called also Transcendental Anatomy. P. A. seeks to reduce under one plan the multitudinous diversities seen in organized bodies, whether animal or vegetable; to discover the principles that govern growth and development; and to point out functional analogies and structural homologies throughout the entire series of organized bodies, i.e., of bodies that either are or have been living.

PHILOSOPHY, n. *fĭl-ŏs′ō-fĭ* [F. *philosophie*—from Gr. *philos*, loved; *sophĭa*, wisdom—from *sophos*, wise]: systematic investigation of the causes of all phenomena both of mind and of matter, or of the phenomena in any one department; the knowledge of things natural and moral, gained by reasoning, experience, and observation: reasoning; course of sciences read in the schools (see below). Philos′opher, n. *-ō-fėr*, one profoundly versed in any science; one who acts calmly and wisely. Philosophic, a. *fĭl′ō-sŏf′ĭk*, or Phil′osoph′ical, a. *-ĭ-kăl*, according to, skilled in, or given to, philosophy; regulated by the rules of reason and experience; calm; rational. Phil′osoph′ically, ad. *-lĭ*. Philosophize, v. *fĭl-ŏs′ō-fīz*, to investigate or reason like a philosopher; to moralize; to search into nature. Philos′ophizing, imp.: Adj. reasoning or investigating like a philosopher: N. consideration or investigation after the manner of a philosopher. Philos′ophized, pp. *-fīzd*. Philos′ophizer, n. *-zėr*, one who philosophizes. Philosopher's stone, an imaginary substance said to be able to transmute or change the inferior metals into gold. Philos′ophism, n. *-fīzm*, unfounded or shallow philosophy; sophistry. Philos′ophist, n. *-fĭst*, one who practices sophistry. Philos′ophis′tic, a. *-fĭs′tĭk*, pertaining to the love or practice of sophistry. Moral philosophy: see under Moral. Natural philosophy: see under Natural.

PHILOS'OPHY: term whose meaning has grown beyond its original significance, which was 'love of knowledge,' and which implied a special taste, appetite, or desire, whose subject-matter was knowledge. At first, man's pursuit of knowledge was subservient to the immediate uses of life; but, in the course of time, an interest was taken in knowing the order of the world, independent of its application to the common utilities. We find that this stage had been reached in Greece, especially, about five or six centuries before Christ; at which time the name 'philosophy' took its rise, being attributed to Pythagoras.

The word P. has had a variety of acceptations, though all pervaded by the one idea of employing the human understanding in the search for increasing knowledge and certainty. It always implies this effort in a distinguished degree, such as only a few persons in any age have ever been able to sustain. The pursuit of knowledge had to become an end in itself; for the mere improvement of practice would not at first have been a sufficient motive for men to undergo the labors of scientific inquiry. Indeed, this improvement was not at all apparent as a consequence of the earliest efforts of speculation. As one celebrated example, the investigation of the properties of the sections of the cone—the ellipse, parabola, and hyperbola—was without any practical use for nearly 2,000 years.

As may be readily supposed, the precise aim of P., that which constitutes its end, has varied with the advancement of its study. In modern times, the pursuit of truth has taken a well-defined form, expressed by the name Science (q.v.). But, in the ancient world, this operation was a mixture of speculation, practice, and sentiment—of legitimate inquiry with aspirations after the unattainable; hence the word P., in its modern use, often refers to the subjects that have not as yet adopted the strict scientific form. On this view, science is the goal and the grave of philosophy. (See Lewes's *Biographical History of Philosophy*.) It is chiefly with reference to morals, metaphysics, and the human mind generally, that the term is still retained.

The characters that distinguish the highest form of truth are Generality and Certainty or Precision; and in proportion as a subject has advanced in these respects it might be said to have become philosophical, but the word scientific is now preferred. The theoretical foundations of a practical subject, e.g., grammar, are sometimes pretentiously called the P. of it. So any department of nature or humanity, where explanations by general laws are furnished, is styled 'philosophical;' thus we have the P. of zoology or of history, and a 'philosophical' naturalist or historian.

Again, after definite branches of knowledge have taken a scientific shape, and have been reckoned as distinct 'sciences' (mathematics, etc.), the general principles and views that are supposed to run through the whole are sometimes called P. This was one of the meanings of the word in Plato. The great work of Auguste Comte bases its title (*Cours de Philosophie Positive*) on this consideration.

Prof. Ferrier remarks that P. is not truth, but '*reasoned* truth;' that is, it must be truth presented under the forms and processes that evolve and establish the highest or scientific knowledge. This is merely another mode of stating that P. implies a special procedure for attaining truth, the ordinary unregulated operations of the understanding being insufficient.

Among the oldest problems of P., is to be reckoned the attempt to generalize the universe, or to resolve all nature into some great unity, or common substance or principle—a conception at the root of the very name 'universe.' Thales considered Water the primordial and fundamental principle. Anaximander adopted as the foundation of the universe something called by him the Infinite or Indeterminate, out of which the various definite substances, air, fire, water, etc., were generated, and to which they were again resolved. Anaximenes assumed Air as the primordial substance, which, by rarefaction, produced fire and ether, and, by condensation, water, earth, and stone. These three philosophers belonged to the Ionic colony of Miletus. Pythagoras was an emigrant from Ionia to Italy: he gave Number as the essence and foundation of all existing things: the different numbers being representative of different natural properties and powers; thus, *five* stood for color, *six* for life, etc. Xenophanes of Kolophon attacked the popular polytheism, and propounded one great indivisible agency comprehending and identified with the universe, which he would not designate as finite or infinite, in motion or at rest. Parmenides of Elea distinguished between self-existent being, Ens, or the absolute, characterized by extension and duration, and phenomenal nature, the region of inferior certainty, or mere opinion. This was the first sketch of what has since been called Ontology, or the science of the *noumenon*, or absolute being. Heraclitus of Ephesus maintained an absolute of a totally different character—a principle of incessant Change, the negation of all substance and stability, a power of perpetual destruction and renovation. Empedocles took his stand upon the Four Elements, out of which all things were constituted by the action of the opposing principles of love and enmity or discord—a poetical representation of attraction and repulsion. Anaxagoras also treated the world as made up of elements, but indefinite in number. By the attraction of each for its own kind, the primitive chaos was separated; but excepting 'mind,' no element ever was perfectly pure, the character of each substance being determined by the predominance of the proper element. These elements were called the 'homœomeries.' Diogenes of Apollonia, last of the series of Ionic philosophers, adopted in a modified form the tenet of Anaximenes, that Air was the primordial element. The celebrated Atomic theory originated with Leucippus, though usually ascribed to his pupil Democritus of Abdera. The elements of Anaxagoras were acted on by mind, but with Democritus their activity was inherent in themselves from the beginning.

The grand problem of External Perception (see PERCEPTION) was agitated at an early period, and has been always reckoned a leading question of philosophy. The first attempt at a solution was an application by Democritus of his atomic hypothesis. He supposed that all things were constantly throwing off images of themselves, which enter the soul through the pores of the organs of sense. He was aware that this left us in a state of uncertainty, as to whether the images corresponded to the otherwise unknown originals.

The many difficulties and uncertainties incident to the search for knowledge could not but be felt by inquirers generally. There was one sect especially impressed by this consideration, hence called Skeptics or Doubters. They were represented in antiquity by Pyrrho. They dwelt on the absence of any sure criterion of truth, and pointed out that what was considered most certain was not free from objections or counter-arguments.

Philosophical speculation began to take definite shape in the age of Plato and Aristotle, the age of the beginnings of many of the sciences. Especially at this time do we find the distinct enunciation of the Philosophy of Human Life, otherwise called Moral and Ethical Philosophy. The questions concerning the end of life, the pursuit of happiness, and men's duties in various relationships, had been answered by a sort of rule-of-thumb experience, rather than by deep reflection or far-seeing combinations. The distinctions of virtue and vice were determined by political society, and connected more or less with religion. There were tests and maxims of conduct, most of which were merely prudential. The first approach to a moralizing strain is found in the poems of Hesiod. He combines a gloomy view of life with much practical wisdom, enjoining justice, energy, temperance, and simplicity of living. The 'Seven Wise Men,' B.C. 6th c., followed in the same course, uttering a variety of sayings or short maxims, whose ordinary subjects were 'the uncertainty of human things, the brevity of life, the unhappiness of the poor, the blessing of friendship, the sanctity of an oath, the force of necessity,' etc., together with the simple rules of prudence. The most celebrated saying of this age was the Delphian inscription (of uncertain authorship), 'Know thyself.' The teaching of the Sophists made another stage in the history of moral philosophy. They opened discussions on virtue, on justice, on the laws, and on happiness; and framed hortatory addresses with a view to moral culture. Socrates then came forward, and instituted a severe logical analysis of the meaning of ethical terms, asking 'What is piety? What is impiety? What is the noble?

What the base? What is just? What is temperance? What is madness? What is a state? What constitutes the character of a citizen? What is rule over man? What makes one able to rule?' The rigid search after strict definitions of these terms may be said to constitute a philosophical method in ethics; hence Socrates is called the first moral philosopher. He gave the impulse to Plato, his successor, who in his turn acted on Aristotle; he gave impulse also to the opposing sects of the Cynics and the Cyrenaics—the one affecting a hard and ascetic life and a proud superiority of the individual will to all outward conventions and customs; the other avowing pleasure as the chief good, holding loosely to the irksome duties of the citizen, and, in despair of attaining happiness, sliding into apathy. The Stoics and the Epicureans afforded a contrast similar though differently expressed. The Stoic ideal was a being in whom the natural impulses and desires should be absolutely subjected to highly abstract views of the universe: the Epicurean ideal was a being moving harmoniously according to natural impulses—in short, following nature to the limits of prudence.

The last phase of ancient P. is represented by Neo-Platonism (q.v.), or the Alexandrian school (see ALEXANDRINE AGE). In the middle ages, speculative P. took the form called Scholasticism (q.v.). At the revival of learning, Descartes and Bacon led in opposite directions, the one representing what is called *a priori* philosophizing; the other, *Induction* (q.v.). Since that time, P. has come to mean more exclusively the inquiries connected with the mind, as exemplified in the writings of Hobbes, Locke, Leibnitz, Berkeley, Hume, Reid, Kant, etc. The qualified phrase Natural Philosophy (in the English sense) was applied to a special department of the outer world, as Moral Philosophy was used in connection with mind and the discussion of moral duties.—For the chief points in the history of modern P., see GERMAN PHILOSOPHY: ECLECTICISM: COMMON SENSE: PERCEPTION: METAPHYSICS: ETHICS: BERKELEY, GEORGE: LOCKE, JOHN: HUME, DAVID: REID, THOMAS: KANT, IMMANUEL: HEGEL, GEORG WILHELM FRIEDRICH: FICHTE, JOHANN GOTTLIEB: COUSIN, VICTOR: HAMILTON, Sir WILLIAM, of Preston: ETC.

PHILOS′OPHY, MORAL: see ETHICS.

PHILOSTRATUS, *fĭ-lŏs′tra-tŭs*, the Elder, of Lemnos: famous Greek sophist and rhetorician: b. prob. in Lemnos, between A.D. 170 and 180. He studied under Proclus at Athens, and finally established himself at Rome, where he became a member of the brilliant and learned circle that gathered round the 'philosophic' Julia Domna, wife of Emperor Severus. He was alive, according to Suidas, in the time of Emperor Philip (244–249). He is author of a number of works still extant, and not without value for their matter, though the style and arrangement are faulty. Among them are a life of Apollonius (q.v.) of Tyana, a description of a collection of paintings at Naples under the title *Imagines*, biographies of a number of sophists, *Heroica*, Letters, etc. There are complete editions of his works by Morel (Paris 1608); Olearius (Leip. 1709); and Kayser (Zur. 1844 *et seq.*), the last by far the most correct and critical.—PHILOSTRATUS the Younger, called Philostratus the Lemnian, also a teacher of rhetoric and oratory, was an intimate friend, perhaps a relative, of the former; but nothing is known with certainty regarding him.

PHILTER, n., or PHILTRE, n. *fĭl′tėr* [F. *philtre;* L. *philtrum*, a love charm or potion—from Gr. *philtron:* It. *filtro*]: potion intended or adapted to excite love: V. to give a love-potion to; to charm or excite to love. PHIL′TERING, imp. PHIL′TERED, pp. *-tėrd.*—The *Philter* represents an ancient superstition. A belief in the efficacy of certain artificial means of inspiring and securing love seems to have been prevalent from very early times; and among the Greeks, and among the Romans in the later days of the republic and under the emperors, love-charms, especially love-potions, were in continual use. It is not certainly known of what these love-potions were composed—nor can we rely entirely on the details given on this subject by classic writers, and their commentators in later time—but there is no doubt that certain poisonous or deleterious herbs and drugs were among their chief ingredients, to which other substances, animal as well as vegetable, are said to have been added, coupled with the employment of magic rites. Thessaly had the credit of producing the most potent herbs, and her people were notorious as the most skilful practicers of magic arts, whence the well-known 'Thessala philtra' of Juvenal (vi. 610). These potions were violent and dangerous in operation, and their use resulted often in the weakening of the mental powers, madness, and death, instead of the purpose for which they were intended. Lucretius is said to have been driven mad by a love-potion, and to have died by his own hand in consequence—though the story scarcely rests on sufficient authority; and the madness of Emperor Caligula was attributed by some persons to love-potions given him by his wife Cæsonia—by which also she is said to have preserved his attachment till the end of his life. In the corrupt and licentious days of the Roman empire, the manufacture of love-charms of all kinds seems to have been carried on as a regular trade; the purchasers, if not the makers of them, being chiefly women. The use of philters seems to have been known during the middle ages; and in the East, the abode of superstition of all kinds, belief in the power of love-potions lingers probably at the present day.

PHIMOSIS, n. *fī-mō′sĭs* [Gr. *phimōsis*, binding or constriction; *phimŏō*, I muzzle or silence—from *phīmos*, a muzzle]: the constriction of the extremity of the prepuce, in which it cannot be drawn back.

PHIPS, or PHIPPS, *fĭps*, Sir WILLIAM: 1651, Feb. 2—1695, Feb. 18; b. Pemmaquid (now Bristol), Me.; d. London, Eng.: adventurer, and gov. of the colony of Mass. Having learned the trade of ship-carpenter in Boston, he built himself a vessel for commercial purposes and for use in seeking for treasures of wrecked vessels. His one great success was the recovery of plate worth $1,500,000 from the wreck of a Spanish vessel near the Bahamas. He commanded an expedition against Port Royal 1690, capturing the place; 1691 he commanded 34 vessels in the invasion of Canada by the colonists. After besieging Quebec for several days, the colonial land and naval forces had to abandon the enterprise. While visiting England to enlist the assistance of the govt. in another expedition against Canada, P. was appointed capt.gen. and gov. of Mass. 1692. He arrived in Boston May 14; and one of his first acts was to appoint a commission of 7 magistrates to take cognizance of cases of witchcraft; he thus put a stop to prosecutions on that charge. He returned to England 1694 to answer complaints that had been brought against him; he was assured that it was the purpose of the govt. to restore him, but while waiting he died of a malignant fever.

PHIZ, n. *fĭz* [a contr. of *physiognomy*]: the face or visage, a term used in sport or contempt.

PHLEBECTASIS, n. *flĕ-bĕk′tă-sĭs*, or PHLEBECTASIA, n. *flĕb′ĕk-tā′zhĭ-ă* [Gr. *phleps*, a vein, *phlĕbos*, of a vein; *ektăsis*, extension—from *ekteinō*, I stretch out]: dilatation or varicosity of a vein, or of part of a vein.

PHLEBENTERISM, *flē-bĕn′tėr-ĭzm:* term invented by De Quatrefages to designate an anatomical arrangement, existing, as he supposed, in certain of the nudibranchiate mollusks, and characterized by ramified prolongations of the digestive tube, in virtue of which the digestive apparatus, to a certain extent, supplies the place of a complete circulatory apparatus, and aids in the process of respiration. The researches of Alder and Hancock, and other zoologists, however, seem to show that in these animals the circulation is as complete as in the gasteropodous mollusks generally, and that these ramified prolongations are of the nature of a rudimentary liver. See De Quatrefages's *Rambles of a Naturalist*, I

PHLEBITIS, n. *flĕ-bī′tĭs* [Gr. *phleps* or *phleba*, a vein in animals]: inflammation of a vein. P., though seldom an original or *idiopathic* disease, is a frequent sequence of wounds, in which case it is termed *traumatic* phlebitis [from the Greek *trauma*, a wound], and is not uncommon after delivery. The disease is indicated by great tenderness and pain along the course of the affected vessel, which feels like a hard knotted cord, and rolls under the fingers. The hardness is, however, sometimes obscured by the swelling of the limb beyond and about the seat of the disorder, partly in consequence of the effusion of serum caused by the obstruction to the return of the venous blood (which thus gives rise to a local dropsy)-

and partly in consequence of the propagation of the inflammation to the surrounding tissues. The inner surface of the inflamed vessel is supposed to throw out fibrinous fluid, which coagulates in layers, and finally closes the tube. If the vessel is small, the consequences of its obstruction may be of little importance; but when a large vein is affected, the consequences are always dangerous, and may be fatal. There are two modes of recovery: solution of the coagulated fibrine may take place, and the vessel may again become pervious; or, as is more frequent, the obstruction may continue, but a collateral venous circulation may be established, and the circulation thus carried on through a circuitous route. With the return of the circulation—in whichever of these two ways it is accomplished—the swelling subsides, and the patient gradually recovers. If, however, the disease advances, suppuration takes place within the coagulum, and one of two things happens: either abscesses are formed along the vein, or the pus passes into the current of blood and contaminates the circulation, giving rise to the perilous disease *Pyæmia* (q.v.). Either condition is dangerous; the latter pre-eminently so.—P. originates usually in some local injury of a vein, and the inflammation, once established, is readily propagated along the course of the vessel. Sometimes very slight injuries give rise to it. It occurs sometimes after venesection, especially with a dull lancet, or one soiled by contact with diseased matter. Women are liable to this disease after delivery, as the veins of the womb are apt to become inflamed, and to communicate the inflammation to the venous trunks connected with them: see PHLEGMASIA.

There is considerable difference of opinion as to the treatment—some high authorities (Dr. Wood, e.g.) recommending 'the very free use of leeches along the affected vein,' and that they 'should be repeated over and over again if the symptoms of inflammation should persevere,' the subsequent application of cold lotions, and the internal use of mercury 'pushed to a moderate salivation;' while others question the utility of such treatment, and recommend 'rest, warm fomentations and poultices, early incision of abscesses, evacuation of bile and fæces by one or two doses of calomel, opium to relieve pain and insure quiet of mind and body, and wine, especially if there has been great loss of blood.'—Druitt's *Surgeon's Vade Mecum*, 8th ed., 326. The latter is in most cases the preferable mode of treatment. During convalescence, the patient must be satisfied if the swelling goes down slowly. Time is required for enlargement of the veins by which the collateral circulation is to be carried on; and active counter-irritation, such as the application of ointments of iodine or mercury, if employed incautiously, frequently does harm by increasing the inflammation. With care, however, they are useful appliances; and if, after giving them a fair trial, much swelling should remain, the practitioner must have recourse to careful bandaging, and the use of diuretics.

PHLEBOGRAPHY, n. *flĕ-bŏg′ra-fĭ* [prefix *phlebo-;* Gr. *graphō*, I write]: a description of the veins.

PHLEBOIDAL, a. *flĕ-boy′dăl* [Gr. *phleps* or *phleba*, a vein; *eidos*, resemblance]: in *bot.*, applied to moniliform vessels; having the appearance of veins.

PHLEBOLITE, *flĕb′ō-līt*, or PHLEBOLITH, *flĕb′ō-lĭth* [Gr. *phleps* or *phleba*, a vein; *lithos*, a stone]: calcareous concretion, often termed *vein-stone*, formed in concentric laminæ by the degeneration of coagulations in veins, or occasionally originating in the coats of the vessels. They are seldom detected till after death, though cases are on record in which, occurring in sub-cutaneous veins, they have given rise to external tumors of considerable size.

PHLEBOLOGY, n. *flĕ-bŏl′o-jĭ* [prefix *phlebo-;* Gr. *logos*, a word, a discourse]: that branch of anatomy which treats of the veins; treatise or discourse on the veins.

PHLEBORRHAGE, n. *flĕb′ėr-ĭj* [prefix *phlebo-;* Gr. *rhagē*, a rupture]: rupture of a vein; venous hemorrhage.

PHLEBOTOMIZE, v. *flĕ-bŏt′ō-mīz* [Gr. *phleba*, a vein; *tomē*, a cutting]: to let blood from a vein. PHLEBOT′OMIZING, imp. PHLEBOT′OMIZED, pp. *-mīzd*. PHLEBOT′OMIST, n. *-mĭst*, one who practices blood-letting. PHLEBOT′OMY, n. *-mĭ* [F. *phlébotomie*, blood-letting—from Gr. *phlebotŏm′ĭa*, cutting of a vein, blood-letting]: the operation of opening a vein to take blood from the body: see BLEEDING: VENESECTION.

PHLEGETHON, *flĕj′ē-thŏn* (i.e., the Flaming): in classic mythology, a river of the infernal regions, whose waves rolled torrents of fire. Nothing would grow on its scorched and desolate shores. After a course contrary to the Cocytus (q.v.), it discharged itself, like the latter stream, into the Lake of Acheron.

PHLEGM, n. *flĕm* [Gr *phleg′ma*, inflammation, phlegm—from *phlegō*, I burn: F. *flegme*]: the thick viscid matter discharged by coughing; mucus; humor or temperament; coldness; sluggishness. PHLEGMATIC, a. *flĕg-măt′ĭk*, or PHLEGMAT′ICAL, a. *-ĭ-kăl*, abounding in phlegm; generating phlegm; dull; sluggish; heavy; not easily excited in action or passion. PHLEGMAT′ICALLY, ad. *-lĭ*. PHLEGMA′SIA, n. *-zhĭ-ă*, plu. PHLEGMA′SIÆ, *-zhĭ-ē*, any inflammatory disease with fever. PHLEGMASIOID, a. *flĕg-mā′sĭ-oyd*, or PHLEG′MATOID, a. *-măt-oyd* [Gr. *eidos*, appearance]: having the appearance of an inflammatory disease. PHLEGMON, n. *flĕg′mŏn*, inflammation; inflamed or inflammatory tumor. PHLEG′MONOUS, a. *-ŭs*, inflammatory; burning. *Note.*—The use of the word arose from the supposed influence of the four humors—viz., 'blood, choler, melancholy or gall, and phlegm,' the last being said to cause a dull and sluggish temperament; the ancient sense of 'a cold viscous humor' is hence contrary to the etymology: see under HUMOR 2, and see Skeat.

PHLEGMASIA DOLENS, *flĕg-mā′sĭ-â dō′lĕnz*, or PHLEGMASIA ALBA DOLENS, or MILK-LEG: disease most frequent in women after parturition, especially if they have lost much blood, but occurring sometimes in unmarried women, and occasionally in men. Its usual beginning is a week or ten days after delivery, with a feeling of pain in the loins or lower part of the abdomen; whence it extends to the groin and down the thigh and leg. The pain soon becomes very severe, and follows principally the course of the internal cutaneous and crural nerve of the thigh and of the posterior tibial in the leg. The limb soon begins to swell, and in two days is sometimes twice its ordinary size; and as the swelling develops, the acuteness of the pain considerably diminishes. The limb is partly flexed, and lies motionless; any movement aggravates the pain. The swelling extends uniformly over the limb, which is pale and shining, and hot and firm to the touch, seldom pitting on pressure. The femoral vein may usually be felt like a hard cord, and this symptom, taken with the swelling, clearly indicates that this affection is essentially *crural phlebitis*. The uniformity of the cord is interrupted by nodules, arising either from inflamed cellular tissue, or from clots within the vein. Both legs are seldom attacked at the same time, and the left thigh is the most common seat of the disease.

This affection usually terminates favorably, the acute symptoms disappearing in ten days or a fortnight. The swelling, however, often continues for a long time, sometimes through life. Very different opinions have been held regarding the nature of this disease. At one time it was considered as the result of metastatic secretion of milk (in other words, as due to the milk leaving the breast, and settling in the thigh; hence the term *milk-leg*). There is now no doubt that the disease in women is inflammation originating in the veins of the womb, and extending to the veins of the lower extremity. The treatment is the same as for Phlebitis (q.v.) generally. Warm poppy fomentations, or bran poultices sprinkled with laudanum, may be applied externally at the beginning of the attack, after which flannel saturated with a liniment, composed of one part of laudanum to two parts of soap liniment, may be applied round the limb in the form of a bandage, but not so tightly as to occasion pain. If necessary, the bowels must be gently opened with castor-oil, and opium given to allay pain and induce sleep.

PHLEME, n. *flēm:* another spelling of FLEAM, which see.

PHLE′UM: see HERD'S GRASS: TIMOTHY GRASS.

PHLŒUM, n. *flē′ŭm*, or PHLOEM, n. *flō′ĕm* [Gr. *phloios*, the bark of a tree—from *phleō*, I teem with abundance]: in *bot.*, the bast portion of a fibro-vascular bundle, consisting at first of succulent thin-walled cells: it is termed also epiphlœum and bast. The term is now scarcely used by authorities.

PHLOGISTON, n. *flō-jĭs′tŏn* [Gr. *phlogistos*, burnt, set on fire—from *phlogizō*, I burn, I set on fire—from *phlox*, *phlogos*, a flame, a blaze; *phlegō*, I burn]: in *chem.*, a substance supposed by the earlier chemists to exist in all combustible matters; and to the escape of this principle from any compound the phenomenon of fire was attributed. The views held regarding it were, however, abandoned by chemists some time after the researches of Lavoisier on combustion. PHLOGISTIAN, n. *flō-jĭs′tĭ-an*, a believer in or supporter of the existence of phlogiston. PHLOGIST′IC, a. *-jĭst′ĭk*, pertaining, belonging, or relating to phlogiston; in *med.*, of or belonging to inflammations and fevers with a hard pulse and topical pain. PHLOGIS′TICATE, v. *-jĭs′tĭ-kāt*, to combine phlogiston with. PHLOGIS′TICATED, pp. or a., not combined with phlogiston: by old writers on chemistry, nitrogen was called dephlogisticated air or dephlogisticated gas; and prussiate of potash, dephlogisticated alkali.

PHLOGISTON, *flō-jĭs′tŏn* [Gr. *phlogistos*, inflammable —from *phlox*, flame]: term employed by Stahl, prof. at Halle, in *Zymotechnia Fundamentalis*, 1697, to designate a hypothetical element which, by combining with a body, rendered the body combustible; and which occasioned combustion by its disengagement, there being left, after its disengagement, either an acid or an earth. In the above-named work, Stahl maintains that the processes of obtaining sulphur from sulphuric acid, and of procuring the metals from their earths or *calces*, are analogous, and consist alike in the addition of his phlogiston. Thus, sulphur, according to the phlogistic theory —which held undivided sway in chemistry through three-quarters of a century, till the time of Lavoisier, who substituted for it the theory of oxygenation (1775–81), and which was maintained by a few chemists, especially Priestley, till the beginning of the 19th c.—was composed of sulphuric acid and phlogiston; lead, of the *calx* of lead and phlogiston; etc. In consequence of the general adoption of the phlogistic theory, when Priestley (1774) discovered oxygen, and when Scheele, a little later, discovered chlorine, the names these chemists gave to their discoveries were *dephlogisticated air* and *dephlogisticated marine acid.* According to modern views, based mainly on Lavoisier's experiments, in the formation of acids and of earths, the *addition* of oxygen takes place instead of the *subtraction* of phlogiston. The question whether the process was, in fact, one of addition or subtraction, was finally decided by the balance, an instrument to which chemistry owes much of its marvellous progress during this century.

PHLORIDZIN, n. *flŏr-ĭd′zĭn*, or PHLORIZIN, n. *flŏr′ĭ-zĭn* [Gr. *phloios*, bark; *rhiza*, a root]: a crystalline substance obtained from the root-bark of the apple-tree, pear-tree, etc. PHLORETIN, n. *flŏr′ĭ-tĭn*, a substance procured from phloridzin by dilute acids. PHLORIZEIN, n. *flŏr-ĭz-ē′ĭn*, a glucose and gum-like substance obtained from phloridzin by the action of oxygen and ammonia.

PHLOX, n. *flŏks*, PHLOXES, n. plu. *flŏks'ĕz* [Gr. *phlox*, flame—from *phlegō*, I burn]: favorite genus of garden flowering plants, having red, white, or purple flowers, of which many fine varieties have been produced under cultivation. The genus is of the nat. order *Polemoniaceæ*, distinguished by a prismatic calyx, salver-shaped corolla, and unequal filaments. The species are numerous, mostly perennial plants with simple leaves. The tall decussate forms originated probably from *P. paniculata*. Other forms, the annuals, have come from *P. Drummondi* of the South. The MOSS PINK (*P. subulata*), is a beautiful adornment of rocky hills, occurs both pink and white, and is used for rockeries. *P. maculata* is the SWEET WILLIAM of gardens. *P. pilosa*, with varying colors of purple, red, and white, gives an appearance of great floral richness to prairies. *P. divaricata* and *P. bifida* are delicate blue. There are a number of other species.

PHLYCTÆNA, n. *flĭk-tē'nă* [Gr. *phluktai'na*, a blister, as that caused by pulling at oars—from *phluzō*, I swell over, I bubble up]: a rising on the skin; a vesicle, pimple, or pustule. PHLYCTENOID, a. *flĭk-tē'noyd* [Gr. *eidos*, resemblance]: bearing a resemblance to phlyctæna. PHLYCTENULA, n. *flĭk-tĕn'ū-lă*, a little phlyctæna. PHLYCTEN'ULAR, a. *-ū-lėr*, having the character of a phlyctæna.

PHOBEROS, *fō'bē-rŏs:* genus of trees of order *Flacourtiaceæ* or *Bixaceæ*, of which one species, *P. Mundtii*, the *Klipdoorn* of the Dutch colonists of s. Africa, though only 20–30 ft. high, attains a diameter of three ft. or more, and is very useful for the purposes of wagon-makers and house-carpenters, the wood being hard and fine-grained: another s. African species, *P. Ecklonii*, the *Roodpeer* of the colonists, has a hard, heavy, and fine-grained wood, used by cabinet-makers, millwrights, etc.

PHOBOS, n. *fō'bos:* in *class. myth.*, a son of Mars, and the god of fear or terror.

PHOBOS, n. *fō'bos* [Gr. *phobos*, fear]: in *astron.*, one of the two satellites of Mars, discovered by Prof. Asaph Hall of Washington 1877. It revolves round Mars three times while that planet turns once round on its axis—a fact unique in the solar system.

PHOCA, n. *fō'kă* [L. *phōca;* Gr. *phōkē*, a sea-calf]: the seal or sea-calf, an amphibious animal. PHOCACEAN, n. *fō-kā'sē-ăn*, an animal belonging to the genus *Phoca;* a seal. PHOCENINE, n. *fō-sē'nĭn*, a peculiar fatty substance found in the oil of the porpoise, which itself yields *phocē'-nic acid.* PHOCIDÆ (see SEAL). PHOCINE, a. *fō'sĭn*, pertaining to the seal tribe.

PHOCÆA, *fō-sē′a:* ancient city in the w. portion of Asia Minor, 25 m. n.w. from Smyrna. It was the northern city of Ionia, on a peninsula with a good harbor on either side. Its people were the first Greeks to sail to distant lands, and at an early period they became noted for maritime achievements. They founded several colonies, and were very prosperous till B.C. 546, when the city came under the Persian power, after which it greatly declined. It was taken by the Romans B.C. 191, and maintained an existence for a long period, but only a few ruins now mark its site.

PHOCÆ′NA: see PORPOISE.

PHOCAS, *fō′kas*, Emperor of Constantinople: d. 610 (reigned 602–610); b. in Cappadocia. He was for some time groom to Priscus, one of the celebrated generals of Emperor Mauricius (q.v.). His brutal courage gained him great reputation among the soldiers, and, though only a centurion at the time of the revolt against Mauricius, he was elevated by them to the throne. To secure himself, he caused Mauricius to be murdered, with his five sons and his principal adherents; and then, by a treaty disgraceful to the empire, rid himself of the Avars. But his troubles were just commencing, for Khosrû II. (q.v.), Shah of Persia, hearing of the death of his friend and benefactor, Mauricius, an event which freed him from the obligation of amity with the Eastern Empire, took up arms to revenge his friend's murder, and to recover for Persia all the territories previously under her sway. The war was fiercely carried on for 24 years, during the first 18 of which the Persian army was uniformly successful, and the Byzantines were almost completely driven out of Asia. See KHOSRU II.: HERACLIUS. P. remained in the capital, to overawe his turbulent subjects, conscious of his unfitness to command the army; and abandoned himself to his animal appetites, tyrannizing over the people without the least regard to justice, aud putting to death whomsoever he thought dangerous—among others, Narses, the celebrated general in the former Persian war. Constantina, widow of Mauricius, excited against the tyrant two formidable insurrections, the latter in 607; but both were speedily quelled; and the ex-empress, with her daughters, was beheaded on the same spot where her husband and sons had been slain. Her principal adherents, some of whom were among the highest officers of state, suffered death under horrible tortures. These cruelties, and the successes of the Persians, had nearly ruined P.'s power and influence; but he himself gave the *coup-de-grâce* to it by insulting his favorite and son-in-law, Crispus, who had remonstrated with him on his conduct. Crispus revenged himself by forming with Heraclius, exarch of Africa, a conspiracy against him—the result of which was the overthrow of the tyrant, who was taken prisoner 610, Oct. 3. After being insulted and tortured, he was beheaded, and his body dragged through the streets by the mob.

PHOCION, *fō'shĭ-on* (Gr. *Phokiôn*): Athenian general, of unusual private virtues; b. about the end of B.C. 5th c. (Clinton, in *Fasti Hellenici*, gives the date B.C. 402); d. after B.C. 323. He was of humble origin, but appears to have studied under Plato, Xenocrates, and perhaps Diogenes also, from the last of whom he may have acquired his habit of caustic sarcasm. His keen and biting wit gave him popular force as a speaker, while injuring him as a politic manager of men. P. was the only orator whom Demosthenes feared. Though gruff in manner, he was kind at heart. P. attracted notice first in the great sea-fight at Naxos (B.C. 376), where he commanded a division of the Athenian fleet, and materially helped to secure the victory. Yet we scarcely hear of him again for more than 20 years; but B.C. 351, with Evagoras, he undertook the conquest of Cyprus for the Persian monarch, Artaxerxes III. (Ochus), and was completely successful. About the same time (the exact date is uncertain), he led an Athenian expedition into the island of Eubœa, where Philip of Macedon was intriguing, and inflicted a severe defeat on that powerful sovereign at Tamynæ. B.C. 341, he was again successful in crushing the Macedonian party in Eubœa and restoring the ascendency of Athens. Two years before this, he had achieved a similar result at Megara; and 340, when sent to the aid of the Byzantines against Philip, he acted with so much prudence and tact, and inspired the citizens with so much zeal and courage, that Philip was forced to abandon the siege, and even to evacuate the Chersonesus; while P. captured several of his ships and coast-garrisons, besides making havoc in the Macedonian territory. Nevertheless, with just appreciation of the real weakness of Greece proper, and of the strength of Macedon, he advocated, even in the midst of his triumphs, pacific views, and the establishment of better relations with the enemy. The war party, led by Demosthenes, prevailed, and P.'s advice was not taken; but the fatal battle of Chæroneia, only two years afterward, in which the independence of the Greek republics was lost forever, proved its soundness. The murder of Philip, B.C. 336, occasioned great exultation, and Demosthenes even proposed a public sacrifice of thanksgiving, and the establishment of religious honors to the memory of the assassin; but P. resisted this monstrous proposal. Thenceforth, his career was chiefly political. We see him struggling at Athens to repress the reckless desire for war on the part of the fanatical patriots, on account of which he was regarded as a traitor; but his personal honor is above suspicion. After the death of Alexander, B.C. 323, the aged P. endeavored in vain to hinder the Athenians from going to war with Antipater. The battle of Cranon, next year, which prostrated his countrymen, again evinced the wisdom of his counsels; but, though very unkindly treated by the Athenians, he used all his influence with the conqueror (who, like Alexander, had a profound respect for him) to mitigate their hardships.

After the death of Antipater, P. was involved in the intrigues of Cassander, rival of Polysperchon, and was forced to flee to Phocis, where Polysperchon delivered him up to the Athenians. He was condemned, by 'a mixed mob of disfranchised citizens, foreigners, and slaves,' to drink hemlock. When the poison prepared was found not enough for all, P. was required to pay for more; and with his old disdainful wit remarked that at Athens a man could not even die for nothing. His body, flung unburied over the borders of the state, was carried by some of his friends to Eleusis, and burned there. The fickle Athenians soon began to raise monuments to his memory. His life was written by Plutarch and Cornelius Nepos.

PHOCIS, *fō'sĭs* (Gr. *Phôkis*): province of Greece proper or Hellas, bounded w. by the Ozolian Lokri, n. by Doris, e. by the Opuntian Lokri, s. by the Gulf of Corinth; about 792 sq. m. The greater part of the country is occupied by the famous mountain range of Parnassus (q.v.). The principal river is the Cephissus. According to tradition, the most ancient inhabitants were the Leleges, Pelasgians, and Thracians, from the gradual mixture of whom the Phocians were believed to have arisen. These were finally united into a free federal state, historically important chiefly from possessing the famous oracle of Delphi (q.v.). During the Peloponnesian war, the Phocians were close allies of the Athenians. In the time of Philip of Macedon, they were involved in a ten years' war, by their opposition to a decree of the Amphictyonic Council, concerning the use of a piece of land belonging to the temple of Delphi. This war, commonly known as the Sacred or Phocian War, ended disastrously for the Phocians, the whole of whose cities (22 in number) were destroyed, with one exception, and the inhabitants parcelled out among the hamlets.

PHŒBUS, n. *fē'bŭs* [L. *Phœbus;* Gr. *Phoibos* (i.e., the Bright or Radiant), Apollo] :title, subsequently a name, of Apollo. It had reference both to the youthful beauty of the god, and to the radiance of the sun, when, latterly, Apollo became identified with Helios, the sun-god.

PHŒNICIA.

PHŒNICIA, or PHENICIA, *fē-nĭsh′ĭ-a* (Gr. *Phoinike,* either from *phoinos,* purple, or *phoinix,* palm-tree—both descriptive of the chief produce of the country, though there is some probability in the suggestion that *phoinos*, blood-red, referred to the dark complexion of the people; the Hebrew term *Kenaan* [Canaan], Lowland, referring to the physical aspect of the country): name given by the Greeks and Romans to a territory about 34°—36° n. lat., bounded by the Mediterranean on the w., by Syria on the n. and e., and by Judæa on the south. Except where the Mediterranean set a natural boundary, the frontiers differed widely at different periods, n., s., and e., according to the gradual rise and decline of the country. Its length may be said to have been about 200 m., while its breadth never exceeded 20 m., making in general a total of about 2,000 sq. m. The products of the soil, by their exportation, to some extent were the foundation of the wealth and greatness of the Phœnicians—the greatest commercial people of the ancient world. Pine, fir, cypress, cedars, terebinths, palm and fig trees, sycamores, olive-trees, and acacias crown the heights; while wheat, rye, and barley are found in the lower regions, together not only with ordinary fruit, but also with apricots, peaches, pomegranates, almonds, citrons, sugar-cane, grapes, bananas—all growing luxuriantly, and forming a forest of finely tinted foliage. The land further yields silk and cotton, indigo and tobacco; and the modern inhabitants of Shur, like their forefathers of old, drive a profitable traffic with the produce of Mount Lebanon, its timber, wood, and charcoal. Flocks of sheep and goats, and innumerable swarms of bees, supply meat, milk, and honey. The sea furnished shoals of fish, and mollusks for the purple of Tyre. There are no precious metals found anywhere in P.; but it is rich in iron, and the stone-quarries of Lebanon were worked in Solomon's time.

The question of the origin of the Phœnicians has not been solved satisfactorily. Their own account, as preserved by Herodotus, speaks of their having immigrated from the 'Sea called Erythra;' a report confirmed by another passage in his History, and by Justin. Strabo speaks of two islands in the Persian Gulf, called Tyros or Tylos and Aradus, in which temples were found similar to those of the Phœnicians; and the inhabitants of these cities stated that the Phœnicians had left them in order to found new colonies. The Erythrean Sea, in its widest sense, extends from the e. shores of Egypt to the w. shores of India; and since in the book of Genesis Canaan is called the founder of the race—a descendant of Ham, not of Shem—some investigators have inferred that the Persian or Arabian Gulf is the original home of the Phœnicians. Against this notion, however, weighty arguments have been brought, from the genuine traditions of the people itself, as preserved, not in a corrupted Greek shape, but in their myths, in the biblical accounts, and in their language, which even in its very oldest remnants (Canaan = Lowland; Sidon = Fishing-place; Giblites = Mountain-people) is purely Semitic. Some investigators assert that Herodotus's (vii. 89) understanding the Persian Gulf as intended by the Erythrean Sea was a misunderstanding, and that the true form of the tradition is preserved by Trogus (Just. xviii. 3, 3), who places the oldest seats of the Phœnicians on the Syrium Stagnum or Dead Sea—with which the Greeks before the time of the Diadochi had no acquaintance—and says that, driven thence by an earthquake, they reached the coast and founded Sidon. This earthquake Bunsen by an ingenious conjecture has identified with that which destroyed Sodom and Gomorrah, and with which Genesis itself connects the migrations of Lot. Nothing is known as to the time at which the first Phœnician settlers entered the country; it seems probable that they did not enter it from one region, but from several sides, and at various periods; and that only very gradually, in the course of long prehistoric centuries, they grew into one nationality, embracing the tribes that inhabited the sea-coast, or Phœnicia proper, from Sidon to Gaza, and the cities north of Sidonia. The latter term included the many separate states originally formed by the various *gentes*, who again, originally, had their own political existence, laws, and even worship. Gradually, however, the larger communities extended their rules over the smaller, or rather combined with them for the formation of a more imposing and important state, into which the different states were merged, without, however, giving up their own individual existence or cultus. The most important of these special tribes or states were the inhabitants of Sidonia—a term expressive of the inhabitants both of the city and of the whole country; the Tyrians, whose settlement, according to their own traditions, was prior to any other Phœnician settlement (about B.C. 2750); and Aradus, founded, according to the native traditions, by Arvadi, 'the brother of Sidon.' From these three tribes—of the Sidonians collectively—are to be distinguished the Giblites, with their two sovereignties Byblus and Berytus, who differed in many respects from the former, and who, it may be presumed, formed at first the ruling state of P., until they were brought under Sidonian dependency. Several smaller tribes or states are mentioned in Scripture—Arke, Sin, Hamath, etc.—but little is known about them.

Of the government and internal constitution of these states or cities, we know almost nothing. There were hereditary monarchs ruling over Sidon, Tyrus, Byblus, Berytus, and Aradus, for whose confirmation, however, the assent of the people was necessary in all cases. By the side of the king stood a powerful assembly, composed of representatives of the old aristocratic families of the land, whose numbers differed at various periods. When Tripolis was founded by Tyrus, Sidon, and Aradus, as a place of joint meeting for their hegemony, every one of these cities sent 100 senators to watch its special interests at the common meeting; and the senate of Sidon seems, B.C. 4th c., at least, to have consisted of 500–600 elders, some of whom were selected probably more for their wealth than for their noble lineage. The king sometimes combined in his person the office of high-priest. The turbulent seething mass of the people, consisting of the poorer families of Phœnician descent, the immigrants of neighboring tribes, the strangers, and the whole incongruous mass of workmen, tradespeople, sailors, that must have abounded in a commercial and maritime nation like the Phœnicians, and out of whose mass must have arisen at times influential men—was governed, as far as we can learn, as 'constitutionally' as possible. Riddance was made of the unruly spirits in Roman fashion somehow in the colonies, or they were made silent by important places being intrusted to their care under strict supervision from home. Only once or twice do we hear of violent popular outbreaks, in consequence of one of which it was mockingly said that P. had lost all her aristocracy, and what existed of Phœnicians was of the lowest birth, the offspring of slaves. As the riches of all the world accumulated more and more in the Phœnician ports, luxury, and too great a desire to rest and enjoy their possessions in peace, induced the dauntless old pirates to intrust the guard of their cities to the mariners and mercenary soldiers, to Libyans and Lydians—'they of Persia and of Lud and of Phut,' as the prophet Ezekiel has it; though the wild resistance which this small territory offered in her single towns to the enormous armies of Assyria, Babylonia, and Greece, shows that the old spirit had not died out.

The sources for the early Phœnician history are of the scantiest description. Of the annals and state documents which filled the archives of every large city, nothing has survived except a very doubtful record, which Sanchuniathus (q.v.) is said to have compiled, about B.C. 1250, in Phœnician from official documents, and which was translated into Greek by Philo of Byblus, and a fragment of which is preserved by Eusebius. The Bible (principally the prophet Ezekiel), Menander of Ephesus, and Dius, a Phœnician, who wrote the history of Tyre from Tyrian annals—fragments of which are extant in Josephus and Syncellus, Herodotus, Diodorus, Justinus, and others—together with a very few notes scattered throughout the church Fathers, contain the sum of all our information. Four great periods, however, are clearly distinguishable in the history of ancient P. The first comprises the beginnings and the gradual development of the single states and tribes, from their immigration to the historical time when Sidon began to take the lead, about B.C. 1500. The second period dates from the conquest of Palestine by the Hebrews. Sidon had then become already the 'first-born of Kanaan,' as Genesis has it, or 'Sidon Rabbah,' the Great Sidon.

The flourishing state of its commerce and manufactures appears likewise from several passages in Homer. The silver vase proposed by Achilles as a prize in the funeral games in honor of Patroclus was a work of the 'skilful Sidonians;' the garment that Hecuba offers as a propitiatory gift to Minerva was the work of Sidonian women. The gold-edged silver bowl given to Telemachus by Menelaus, Hephaistos had received from the king of the Sidonians. Ulysses is left on the island of Ithaca by the Phœnicians, who sail away to 'well-peopled Sidonia.' The gradual ascendency of the rival city of Tyre marks the beginning of the third period, in which P. reaches the height of its power, in which her ships covered the seas, her commerce embraced the whole known earth, and her innumerable colonies flourished far and near. The first historically recorded item of Tyre's activity is her foundation of Gades, a few years before that of Utica, B.C. 1100. The reason of the sudden greatness of Tyre is found in the defeat of the Sidonians by the king of 'Askalon'—a term probably meant to represent the whole pentapolis of Philistia—about B.C. 1209; in consequence of which, the principal families of Sidon 'emigrated in their ships to Tyre, which [viz., the Island-city] they founded.' B.C. 11th c., in the time of Samuel the prophet, 'the princes of the Tyrians' are already spoken of instead of the Sidonians, as the representatives of P. During the reigns of David and Solomon—under Hiram, B.C. 980–917—the friendliest relations existed between the Hebrews and the Phœnicians: both in the full bloom of their power. Each country needed what the other could supply. Hence their close alliance, which led even to common commercial enterprises in ships built by Solomon, the supercargoes of which belonged to him, while the mariners and pilots were Hiram's.

By this time, Phœnician colonization had reached its utmost extent. In the space of three centuries, B.C. 1300–1000, the Phœnicians had covered all the islands and coasts of the Mediterranean with their forts, their factories, and their cities; and their ships everywhere found their own ports. They had colonized Cyprus, thus commanding the waters of the Levant and the coasts of Syria and Cilicia. Kithion, Amathus (Hamath), Karpasia, Paphos, with its magnificent temple of Ashera, Keryneia, and Lapothos, were some of their principal settlements in those regions. Northward, on the coast of Cilicia, they founded the cities Myriandros, Tarsos, and Soloi. Migrating to the w., they took possession of Rhodes, Crete (compare the myth of Zeus and Europe), Melos, Thera, Oliaros (near Paros), and Cythera on the coast of the Peloponnesus. E. of the Ægean, we find them at Erythræ, and, further, as masters of the islands of Samothrace, Lemnos, and Thasos with its wealth of gold mines. The Ægean Sea, with all its islands, being in their hands, they sailed thence further w., to Sicily, where they settled at Motye, on the extreme w. point; founded Rus Melkarth, in the s. (Heraclea Minoa); in the n., Machanath (Panormos, Palermo), and, further, Melite (Malta) and Gaulos. They owned Caralis (Cagliari) in Sardinia, Minorca, Iviza (Ebusos), Elba; on the opposite, or African coast, Hippo, Utica, Hadrumetum, Leptis, and some minor island states. From Sardinia and Minorca, the indefatigable mariners went still further w.—through the Straits of Gibraltar to Tarshish (the California of those days), or to Spain, where they founded Gadeir or Cadiz, and, in the s., Karteja, Malaka, and Abdarach. From here, having colonized nearly the whole Spanish coast, they went northward to the tin, islands (Scilly Isles), and to Britain itself. And while they thus explored the regions of the Atlantic, their alliance with the Hebrews had permitted them to find the way to the Indies by the Red Sea. Though their colonization was thus so vast in its range, it was almost confined to the coast, as were their habitations even in their own land. Their inland settlements seem to have been very few. Everywhere they possessed themselves of unoccupied inlets, which they developed into harbors.

The impulse given to industry and the arts by this almost unparalleled extension of their commercial sphere was enormous. Originally only exporters or traders for the wares of Egypt and Assyria, they soon began to manufacture these wares, and drew the whole world into their circle of commerce. As to the early and most extensive commercial intercourse between P. and Greece and her colonies, it is a striking fact that nearly all the Greek names for the principal objects of oriental commerce were Phœnician, or rather Semitic—identical almost with the terms found in the Old Testament. Thus, of spices—myrrh, cassia, cinnamon, galbanum, narde, aloe, crocus, nitron, balsam, etc.; of jewels and precious stones, sapphire, jasper, smaragdos; of fine materials, and garments, byssus, karpasos, sindon, etc.; musical instruments—nabla, tympanon, sambyke, etc.; oriental plants, vessels, and even writing implements. The wealth of silver, iron, tin, and lead was got chiefly from Tartessus. The descriptions of the abundance of precious metals there verge on the fabulous. Thus, the Phœnicians are supposed to have made even their anchors of silver, when they first discovered the country, not knowing how to stow away all the silver in their vessel. What must have been the state of these mines is clear from the fact that, even in the Roman time, 40,000 men were constantly employed as miners, and the state received a clear revenue of 20,500 drachmas daily. The 'Fortunate Islands,' which, according to Diodorus, they discovered after many days' sailing along the coast of Africa, beyond the Straits of Hercules, and which, to judge from the name Purpurariæ given to some islands off the coast of Mauritania, seem to have been the Canaries, yielded them the shell-fish purpura, so useful for their dyeing manufactories. Besides their wholesale commerce by fleets and caravans, they appear also to have gone about the interior of Syria and Palestine, retailing their home or foreign produce.

Although the Phœnicians were erroneously believed, by the western tribes, to manufacture all the wares in which they dealt, yet no inconsiderable proportion of them was really their own work. None of their manufactures, however, stood in so high repute throughout antiquity as the purple dye prepared from the muricidæ, a shell-fish of its coast; and none excelled more in it than the Tyrians. Purple was an almost indispensable luxury of antiquity, particularly in Asia. In temples and palaces for gods and men, purple garments, hangings, curtains, and veils were needed; and Alexander the Great found in Susa alone a store of purple worth 5,000 talents. Sidon's principal production was glass—invented there, it was said, by accident; but probably the invention was derived from Egypt, where it was in use long before; the Phœnician glass, however, was always supposed to be the best. The Sidonians knew the use of many of our own contrivances—the blow-pipe, the lathe, and the graver. Hardly less great was the fame of Phœnician metallurgy. Their mining operations in the Lebanon and Cyprus, where they dug for copper; in Thasos, where, according to Herodotus, they overturned a whole mountain in searching for gold; but particularly in Iberia, where at first silver was so abundant that hardly any labor was required to obtain it—were stupendous; and the minute description of the mining-process in Job (xxviii. 1–11) was derived probably from a sight of Phœnician mining-works. That they well understood how to work the metals thus gained has been observed above. The art of founding brass must, indeed, have reached high perfection to enable Hiram Abif to execute such works for Solomon's Temple as they are described in the Bible. No less familiar were they with the art of imitating precious stones, and coloring glass by metallic oxides. To Sidon is further attributed the pre-eminence in the glyptic and plastic arts; and the artists sent by Hiram to Solomon were skilful workers in gold and silver, in brass, in iron, in purple and in blue, in stone and in timber, in fine linen, and the engraving of precious stones. Their architecture seems to have been Cyclopean. Their vessels, originally simple rafts, gradually developed—with the aid of the Lebanon, which afforded inexhaustible supplies of timber, and of Cyprus which possessed all the materials necessary for fitting up a ship from the keel to the sails—into a first-rate fleet of round ships, or gauli, for short or coasting voyages; war-galleys, or triremes; and fifty-oared craft, long in build, and adapted for rapid sailing or rowing. The internal arrangement of these vessels was excellent, and excited the wonder and admiration of the Greeks, by their adaptation at once for navigation, freight, and defense. Their extraordinary three years' voyage of discovery, undertaken in the service of Necho, round Africa, going out of the Red Sea, and returning by the way of the Straits' mouth, is as well known as their voyages in the service of Solomon.

The golden age of P., during which her colonies, her manufactures, and her commerce were in this most brilliant phase, seems to have waned nearly simultaneously with that of Judæa. As Solomon in the latter, so does Hiram in the former, mark the end of prosperity, riches, and glory. According to a fragment preserved in Menander, Hiram was followed by his son Baleastartus, who died after a short reign of seven years, B.C. 940, and a long series of political calamities and civil wars ensued. The last of Hiram's sons, Pheletus, fell 898 by the hands of Ithobaal, priest of Astarte, into whose family now passed the kingdom of Tyre. He is the Ethbaal mentioned in Scripture as the father of Jezebel, and father-in-law of Ahab; and a peculiar coincidence is the simultaneous mention of the three years' drought in Judæa (to which an end was put by Elijah's prayer) and in P., where relief was obtained by Ithobaal, who seems to have stood in the odor of sanctity. It was during this unhappy period that the celebrated Phœnician princess Elissa, better known as Queen Dido (q.v.), fled, together with some of the most aristocratic families of Sidon, to Libya, where, about B.C. 813, they founded a new city (Kartachadata = Carthage), near the spot of an ancient Sidonian settlement. The fourth and last period of Phœnician history may be dated from the middle of the 8th c., when Shalmaneser, King of Assyria, invaded P., and besieged Tyre five years, but without result; and there is every reason to believe that the peace concluded at the end of this period was very favorable to Tyre. But soon afterward, P. was drawn into the struggle for supremacy between Chaldæa and Egypt, and was conquered by Chaldæa. A further calamity befel P. at the hand of Pharaoh-Apries, who anticipated Nebuchadnezzar's intended attack on Egypt by destroying the Phœnician fleet, conquering the country, and pillaging it. These calamities produced a series of internal troubles, in consequence of which the constitution was constantly changed; and we hear now of a series of kings, and now of provisional *suffetes*—all their reigns being very brief. From that time forward, and even previously, the special histories of Sidon and Tyre, which alternately possessed themselves of the hegemony of Phœnicia, constitute the history also of the country itself: see these two titles. The battle on the Issus terminated even the shadow of P.'s independent existence, and it shared the fate of Alexander's vast empire. B.C. 65 it became, under Roman dominion, part of Syria, and has since shared her fate for good or evil. See SYRIA: SIDON: TYRE: CARTHAGE: also PALESTINE: PHILISTIA.

Religion.—The real character of the religion of the Phœnicians has as yet been imperfectly demonstrated. Deprived of all original and direct information on the subject, we have to cull what scanty notices we may from Greek and Latin writers, or to gather knowledge from allusions in the Bible. Not a scrap of native literature has survived; and the supposed extracts from a Greek version by Philo, of Sanchuniathus's Phœnician works, found in Eusebius—hitherto our chief source of information—must be used with more than ordinary caution: see SANCHUNIATHUS. Therefore, without entering into futile speculations, we confine ourselves here to a few general and well-ascertained facts; premising, however, that Phœnician theology is far from being a hopeless province, whatever it may now appear. Excavations are in process in all directions, both in the mother country and in the colonies, and new discoveries are constantly brought to light.

The religion of the Phœnicians was, like all ancient Semitic religions—except that of the Hebrews—a kind of pantheistic worship of nature. While Monotheism, with the descendants of Abraham, assumed the existence of a supreme personal being exerting a power within nature, which, according to its own free will, creates and destroys, the rest of the East assumed a Dualism: two elements, a male and a female; or two highest deities, one of whom begets and has the power to destroy, while the other conceives and produces. These two supreme beings were sometimes merged in one deity, with male and female attributes, which spread out into immense ramifications: representatives now of the general powers of nature, now of the particular phenomena in nature or in the life of men. Those religions had deities who ruled over the stars, the elements, the seasons; over special localities, or over certain phases of life. No nation of antiquity perhaps possessed a more endless pantheon than the Phœnicians: a fact easily explained by their peculiar position and relations. Consisting originally of a variety of tribes, each of whom had had their own special deities—though the supreme *Numen*, or the principle of their chief deity, was probably the same with all—those Phœnicians who dwelt in the north differed in some respects, such as the names and attributes of certain gods, from those of the south. Besides this, it must not be forgotten that the period of Phœnician history ranges over 2,000 years, and their political career, as well as their commerce, brought them in close and constant contact with nearly all the civilized nations of the then known world; and being both superstitious (as sailors and traders are prone to be), and possessed of an adaptability to which partly they owed their success in other respects, they easily, or even greedily, received into their wide pantheon those who, albeit the special national gods of others, or because of this very reason, could either harm or benefit them. It may be also that an easy nonchalance about these things, such as the wealthy and aristocratic classes displayed in ancient Rome and elsewhere, and the interest of the priests who received very considerable tithes of every sacrifice (our information on that point leaves nothing to be desired), went hand in hand to favor the gradual introduction of as many gods and goddesses as pleased the common people. Their proper divisions, however, their real names and derivations, and the history and time of their nationalization, will long continue to puzzle investigators.

Setting aside such more or less vague and undefined names of deities as were common to the whole Semitic stock, and as they are found in the Hebrew records—like *El* (Mighty One), or (in plural) *Elim; Ollonim* [*Elyon*] (the Most High); *Adon* (Lord); *Melech* [*Moloch*] (King); etc.—we find in the first rank of gods (of Tyre and Sidon) Baal (q.v.) and Astarte (q.v.). Baal occurs in two different characters, as it were—as *Baalsamin* (Lord of Heavens), the highest god ruling over the universe, the Zeus Olympios and Jupiter Optimus Maximus; and as *Baal Melkarth*, the special national numen. Baalsamin is originally identical with the Babylonian Bel or Baal. The third highest deity was the goddess Astarte, presumed to be the same as the Ashera whose licentious worship was execrated in the Hebrew Scriptures. She was propitiated (as Venus, goddess and planet) by prostitution. Some have sought to distinguish between the Tyrian and the Sidonian Astarte, and the respective characters of their worship. The Tyrian Astarte was known principally under the name Tanis (q.v.), the Assyro-Persian Tanais, and was married to Baalsamin, and also to Adonis.

The principal deities of northern P.—the non-Sidonian tribes—consisted of a different trias—*El*, *Baaltis*, and *Adonis*. The first was the supposed founder of the two oldest Phœnician cities, Byblus and Berytus, and corresponded to (being originally perhaps identical with) both Baalsamin, as the highest deity, and Melkarth, as the special god of Tyre. Baaltis, Beltis (My Lady—Aphrodite), worshipped at Byblus, Berytus, Aphaka, Arke (Architis), etc., was joined to Adonis (q.v.), whose cultus had been imported from Assyria, and is therefore unknown in the more ancient Phœnician colonies, in Africa and Spain. Byblus called him Adonis Ganas, or Ganan (perhaps Gaavan, the Exalted); near Byblus, we find him worshipped as Elyon (the Highest); as Esmun in Berytus, and perhaps also under the name Memnon, at Apamea, where an annual mourning-festival was celebrated in his honor; further, near the river Bandas at Paltos; and at the river Belus. As Serach (the Brilliant) in Phœnician, and Kharush (the Sun) in Persian, he appears to have had some relation to the star-and-planet worship which became, under Assyrian influence, a prominent feature of the Phœnician religion.

Besides these more or less localized gods and goddesses (*Dii Majores*), a certain number of deities—state and country deities—were worshipped in common by all Phœnician states. They were called the Children of Sadik (the Just), or the Children, or the Patæki (Descendants of Phtha), or the eight Kabiri (Strong Ones). They are the maritime gods, and their images were placed on the prows of Phœnician ships. As protectors of navigation, they are identified with the Dioscuri; and again, as representatives of heat, breath, and life, they received the names Lares and Penates. Their individual names are not generally mentioned; they seem (compare Esmun = eighth) to have been merely counted. Their mode of worship was most mysterious—as indeed some of the earliest mysteries were closely connected with it.

Besides these, they worshipped certain phenomena, personified attributes, and qualities. Their planetary divinities were the Sun and his four horses—to whose worship belongs, among others, to a certain extent the annual festival of the Resurrection of the (Tyrian) Herakles, under the emblem of a column in the form of a rising flame (Chaman); the Moon, with her chariot drawn by white bulls; the planet Mars (Aziz or Nergal); Jupiter (Kochab Baal); Venus (Astoret Naamah = lovely Astarte), with her voluptuous cultus; and Saturnus (Moloch Kronos), the evil principle. The elements were revered either in conjunction with certain deities or on their own account. The water, to which sacrifices were offered both of human beings and of animals or fruits, was hallowed in all its shapes—as the sea, as rivers, fountains, lakes—by which people took their most solemn oaths; the fire, in connection with the oldest deity of P.; the light (Moloch); the air and the winds; the earth and all its plants, its forests, and glens, and trees, and especially its mountains, as the 'symbols of the High Ones,' or as 'Faces of God,' e.g., Mount Carmel, Lebanon, Anti-Libanus, and others. Of animal-worship only small traces are found.

Abstract notions and ideas were not omitted. The Year and the Months, Day and Night, Aurora (Lilith), Age and Youth, Art and Love, had their altars. Nor were certain professions and trades without their visible patrons. Thus, there are gods of agriculture and horticulture, like Dagon, the god of grain; a Dionysos, whose Phœnician name is lost, as the god of winegrowers; a god who is the numen of fruit-growing, of pisciculture, of mines, etc. Chthonian gods are not lacking. The god of Death—the king of the lower regions—is Muth = Death (Pluto), who is represented as a small child. His reign was shared by a goddess whose name is vaguely known as Eloti (My Goddess), occasionally identified with Astarte, Dido, Anna, Persephone, Europa, and a great many other deities.

Allusion has been made to the mode of worship of the Phœnicians, and the places chiefly selected for their rites. Mountains, heights, rivers, lakes, fountains, meadows, glens, were, as above noted, the favorite habitations of the gods. But the Phœnicians were also among the first who erected temples. These were generally divided in two parts, containing the sacred arks (the mystic cists of the Greeks), and the chariots upon which the sacred objects were at times carried about. Not being intended to be prayer-houses, but as dwelling-places for special gods, they were rather small, and did not even contain the altar upon which the sacrifices were offered. This stood generally at the entrance of the temple, and around it the priests and hierodouloi danced in their service. Pure wells and an everlasting fire were the indispensable conditions of a sanctuary. The sacrifices themselves, as far as they consisted of animals, offer great analogies to those of the Jews; but the P. offered also human sacrifices—chiefly first-born male children, as that which the suppliant held dearest—chiefly to Baalsamin, Baal Hamon, and Astarte. Such human sacrifices or burnt-offerings took place annually at the great festivals of expiation; and further, on extraordinary occasions, at the beginning of important enterprises, such as a campaign; and in great casualties: in order to expiate by one sacrifice the sin of all. The same fanaticism which fancied the gods best pleased by the offering up of what was most precious led the Phœnician women, like the Babylonian, to sacrifice their honor in honor of Astarte, on certain occasions; so that some sanctuaries became hotbeds of prostitution. Circumcision—another kind of sacrifice—was not common among all the Phœnician tribes, it being a rite sacred principally to El, the god of Berytus and Byblus.

For festivals and pilgrimages in general, see FESTIVALS: GREEK RELIGION: ETC. What is noted under those titles respecting their character in Polytheism (their connection to a great extent with the births, deaths, resurrections, and other personal phases of special deities) holds good here. No doubt, these festivals, like those of the Hebrews, and all other ancient nations, had, besides their religious, also their political and commercial significance; and P. was particularly, by its eminent position in the world's trade, a place toward which flocked on solemn occasions pilgrims from all parts of Asia and Africa. 'Festival Embassies,' as they were called, were dispatched thither from Syria, Arabia, Babylonia, Cappadocia, Cilicia, Egypt, Armenia; even from India, Ethiopia, Persia, and Scythia; and not until the 5th c. after Christ did these pilgrimages to P. entirely cease. One festival is peculiar to Tyre, and, indeed, it is still celebrated by the present inhabitants of Sur—viz., the 'Wedding of the Land-water with the Sea-water.' On these occasions, the people walk in procession to the well near the town-gate, and pour some pails of sea-water into it, to render it clear and sweet again for a long time.

It would be vain to try, with our scanty and adulterated sources, to gain a deeper insight into the ideas attached to the names, attributes, and modes of worship of the deities mentioned, or to speculate on their moral influence on the people of P. That these ideas were eminently practical; that arts and manufactures flourished among them more than among any other ancient nation; that they knew how to turn science into money; that they were, in fact, shrewd men of business—all this we know, but little more. Atheists or Pantheists, whichever they must be called in the modern sense of these words, it is extremely doubtful whether they, any more than the uninstructed mass of the Hebrews before the Exile, believed, as a body, in immortality. What was their influence on Greece, Rome, the whole ancient and modern world, in the province of religious thought, there are no means fully to ascertain. Comparative Mythology has a vast field to explore in this direction.

Phœnician Language and Literature.—Except Greek and Latin, no language was so widely known and spoken throughout antiquity as the Phœnician; and monuments of it have been found, and continue to be found, almost all over the ancient world. We can only vaguely speculate on its early history and its various phases, so long as our materials yield so little information on that point. Its decline seems to date from B.C. 8th c., when Aramaisms crept in in overwhelming numbers. Finally, the close contact with, and the everywhere preponderating influence of the Greeks, superceded—chiefly after Alexander's time—the ancient language almost completely; and even coins with Phœnician legends occur not later than B.C. 2d c.—An important Phœnician literature seems to have been extant as late as the 1st c. after Christ, but it has disappeared from the face of the earth. After the second half of tbe 3d c., the language had vanished entirely in the country itself; and Jerome, who lived in Palestine, mentions the Punic, but never the Phœnician. In the West, it survived to a much later period. In Mauritania and Numidia, it remained, in a corrupted form, the reigning tongue as late as the 4th c.; and Augustine draws his explanations of Scripture from the Punic current in the 5th c. There was a translation of the whole Bible into Punic made for the use of the Punic Christian churches; and in and near Tripolis and Bizanium, it was the language of the common people till a later period. From the 6th c., however, it rapidly died out, in consequence chiefly of the Vandals, Goths, Moors, and other foreign tribes overrunning the country, and ingrafting their own idioms on the language.

As a branch of the so-called Semitic family of the Hebrews, Syrians, Arabs, etc., the Phœnicians naturally are closely related to these also with respect to language. The affinity of the 'speech of Canaan,' as the Hebrew is called sometimes, with the Phœnician, was indeed remarked at an early period. Augustine, Jerome, and Priscian pointed out—sometimes in order to back some very peculiar notions—how closely these two languages and their dialects were allied. Yet it must be obvious at first sight that, however near the two idioms may originally have stood to each other, the peculiar relations and fortunes of the two races who spoke them must have produced substantial changes in their structures in the course of time. While the ancient scriptural monuments of the Hebrews—outwardly and inwardly—exhibit a rare unity of idiom and form, the ancient hallowed utterance becoming a type and model for later generations, the Phœnicians, on the other hand, not confined within the narrow limits of their home-country, but mixing freely with all nations of the earth, spreading their own colonies far and near, opened a wide field for the 'development' of their language, rather for its corruption, by its entering into alliance with Libyan in Africa, Sardinia, and Spain; and with Aramaic in n. Phœnicia, Cilicia, perhaps even in Cyprus. Thus it came to pass that the two languages, which originally may have been identical in old Canaan, became more and more widely divergent. To enter into a more detailed disquisition on this or other cognate points seems more hazardous now than it seemed only a very few years ago; for the more numerous our fragmentary discoveries in Phœnician literature are becoming of late, the more evident is it that we are only at the beginning of Phœnician philology.

In structure the Phœnician Language resembles the Hebrew to some extent (see JEWS: SEMITIC LANGUAGES); we therefore simply point out the most palpable differences between them. In the first instance, we observe the very strange fact, that what is considered an archaism or an isolated dictum in Hebrew appears as a common expression in Phœnician. Certain grammatical terminations, obsolete in Hebrew are in use in Phœnician—so that it appears that the Phœnician had retained more of the ancient Canaanite speech than the Hebrew, which gradually transformed and refined it by grammatical niceties. Another feature is the preponderance of the Chaldee, rather Aramaic, words and forms—though here again we are on very dubious ground. It might further be questioned whether our Phœnician Inscriptions—all belonging to a very late period—are not rather a faithful reflection of the Hebrew of their period, which, since B.C. 8th c., had more and more changed into Aramaic. It is certain that the original language of Canaan was perfectly free from Chaldaisms, and that these are but a late corruption—such as we find also in the later books of the Old Test. Yet there are other features quite peculiar to the Phœnician, which—though not of sufficient importance to warrant our separating the dialect entirely from the Hebrew—are of a nature not to be explained by any Semitic analogy; e.g., some differences in pronunciation of vowels, in treatment of consonants, in formation of pronouns, some verbal forms, and words entirely foreign to the Semitic. Again, a distinction is to be made between the Phœnician of P. and that corrupted form of it spoken in the w. colonies, called Punic; and further, that idiom peculiar to the inhabitants of Leptis, called Libyo-Phœnician—a mixture of Phœnician and

Libyan, with vast preponderance, however, of the former element.

The difference in the pronunciation may be characterized briefly as a tendency toward an obscuring or lowering of the vowels: thus, the Hebrew *a* is changed into *o*, the *e* into *i* or *y*, *i* into *y*, sometimes into *u*, and *o* into *u*. Peculiar is also the use of the Hebrew *Ayin* as a vowel (*mater lectionis*), with the pronunciation of *o* or *u:* on some occasions, however, it is entirely omitted. The gutturals are changed at times, as in the corrupted orthography of Samaritan and Sabian; so that *L* and *R* are sometimes assimilated with the next consonant in the middle of the word, or entirely omitted, etc. As to grammar, our knowledge is extremely limited. A few undoubted facts are the termination of the nominative form in *at* instead of the Hebrew *ah*, greater variety of genitive forms in Phœnician, difference in the formation of the pronoun, and identity of the article with that in Hebrew (*ha*). For the Phœnician alphabet, the model of all European alphabets, see ALPHABET.

The Literature of P., in its original form, has, as we said, perished. What traces and fragments remain of it have survived in Greek translations. But from even these small remnants, we can easily imagine the extreme antiquity and the high importance and vast extent of these productions, which, at first, seem to have been chiefly theological or theogonical. Their authors are purported to be the gods themselves, and the writings are accessible only to the priests and to those initiated in the mysteries. From the allegorical explanations of these exalted personages sprang a new branch of sacred literature, of which those fragments of Cosmogony mentioned above are derived. To the literary age of Taaut, Kadmus, Ophion, Esmun, etc., succeeded Thabion, Isiris, Sanchuniathus, and Mochus, who founded the schools of Priests and Prophets. These cultivated the sciences, chiefly the occult ones, magic, and the like. Nearest to the Sacred Literature stands Didactic Poetry, somewhat related to the Orphic, whose chief representatives are Sido, Jopas, etc. The erotic poetry is characterized as very sensuous, both in P. and in the colonies. Of historians are mentioned Mochus, Hypsikrates (Sanchuniathus?), Theodotus, Philostratus, Menander, and others; but these are mere Greek versions of their Phœnician names, and absolutely nothing has been preserved of their writings. Punic literature also is frequently mentioned by Greek and Roman writers. Geography, history, agriculture, were the fields chiefly cultivated by the colonists of Carthage and the West generally.

The monuments that remain to us, and which have enabled us to judge for ourselves of the religion, the language, and the manners of the Phœnicians, are of twofold kind—either legends on coins and lapidary inscriptions, or Phœnician proper nouns and texts embedded in the works of ancient classical or sacred writers. The principal and ever-growing source for our information, however, are the monumental inscriptions, of whose existence, till the middle of the 18th c., nothing was known. The most numerous Phœnician remnants have been discovered in the colonies. Richard Pococke first found, on the site of ancient Citium (Larnaka of to-day), 31 (not 33, as generally stated) Phœnician inscriptions, which he deposited at Oxford (pub. by Swinton 1750). Malta, Sardinia, Carthage, Algiers, Tripolis, Athens, Marseille, each have yielded a considerable number, so that altogether we are now in the possession of about 120 monuments, either votive tablets or tomb inscriptions. The latest and most remarkable are those now in the British Museum, discovered at Carthage a few years ago by N. Davis, consisting of votive tablets, a (doubtful) tombstone, and a sacrificial tariff, which completes another stone found some years ago at Marseille of the same nature; both setting forth the amount of taxes, or rather the proportionate share that the priest was entitled to receive for each sacrifice. An exceedingly valuable trilingual inscription, referring to the gift of an altar vowed to Eshmun-Asklepios, has been discovered recently in Sardinia. (See below.) One of the most important historical monuments is the sarcophagus of Ashmanasar II., King of Sidon (son of Tennes?), found at Tyre 1855, whose age has been conjectured variously between B.C. 11th c. (Ewald)—a most incongruous guess indeed—the 7th c. (Hitzig), the 6th c. (Duc de Luynes), and the 4th c. (Levy), of which we give the commencement, literally translated: 'In the month of Bul, in the 14th year that I reigned, King Ashmanasar, King of the Sidonians, son of King Tebnith, King of the Sidonians—spake King Ashmanasar, King of the Sidonians, saying: Carried away before my time, in the flood of days—in dumbness ceases the son of gods. Dead do I lie in this tomb, in the grave, on the place which I have built. I myself ordain that all the nobles and all the people shall not open this place of rest; they shall not seek for treasures and not carry away the sarcophagus of my resting-place, and not disturb me by mounting the couch of my slumbers. If people should speak to thee [and persuade thee to the contrary], do not listen to them. For all the nobles and all the people who shall open this sarcophagus of the place of rest, or carry away the sarcophagus of my couch, or disturb me upon this resting-place, may they find no rest with the departed; may they not be buried in a tomb, and may no son and successor live after them in their place;' etc.

The votive tablets bear the same character throughout, differing only with respect to the name of the man or woman who placed the tablet in a certain sanctuary in accordance with his or her vow. Their material is mostly limestone or fine sandstone, rarely marble, and they vary from 5 to 15 inches in height, from 4 to 7 in width, and from 1½ to 4 in thickness. Beginning in most cases with the dedication to the god or goddess, or both, thus: '[Sacred] To the god . . . [this tablet] which vowed

N., son (daughter) of N. When he (she) heard my voice and blessed,' or 'hear my voice and bless;' etc., the sepulchral tablets generally run somewhat in this manner: 'Stone erected to . . . , who lived . . . years.' —Much in this department remains to be investigated. Even the paleographical side has, notwithstanding all the ready material, not yet been settled satisfactorily. One point, however, is indisputable even now. There are at least two kinds of Phœnician writing distinguished clearly. The older, purer, more orthographical, and more neatly executed, is found in the inscriptions in P., in Malta, Athens, Citium, and Carthage; the younger, corrupted not only in grammar and language, but also in the form of the letters, which are less carefully executed, and even show some strange, probably degenerate characters, is found chiefly on the monuments in Cyprus, Cilicia, Sardinia, Africa, Spain, Numidia, and adjacent parts.

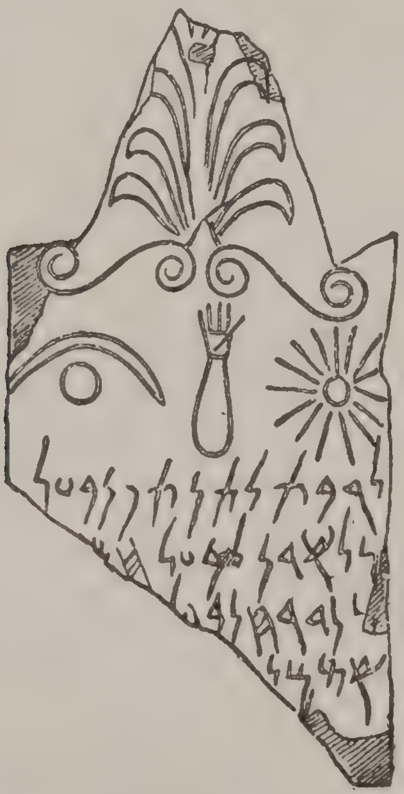


Fig. 1.

I.e , Lerabbath Letanith Pen-Baal
Uleaddan Lebaâl Ch[ammon A]
[Sh] Nadar Chanbaâl [Ben Âbd]
Ashmun . . . . [Shema]
[Ko]l[a Barcha . . . .

'To the Lady Tanith, the Face of Baal, and to the Lord Baal Chammon [is dedicated this *scil*] which has vowed Hanbaâl [the son of Âbd] Ashmun. . . . [When he (or she) hears his voice, may he (or she) bless.]'

Besides these monumental sources for the language, there are a few remnants of it embedded, as we said, in ancient non-Phœnician writings. The Old Test. alone, however, has preserved its words—proper nouns chiefly —unmutilated. Later eastern writers even, besides the Greeks and Romans, have corrupted the spelling to such

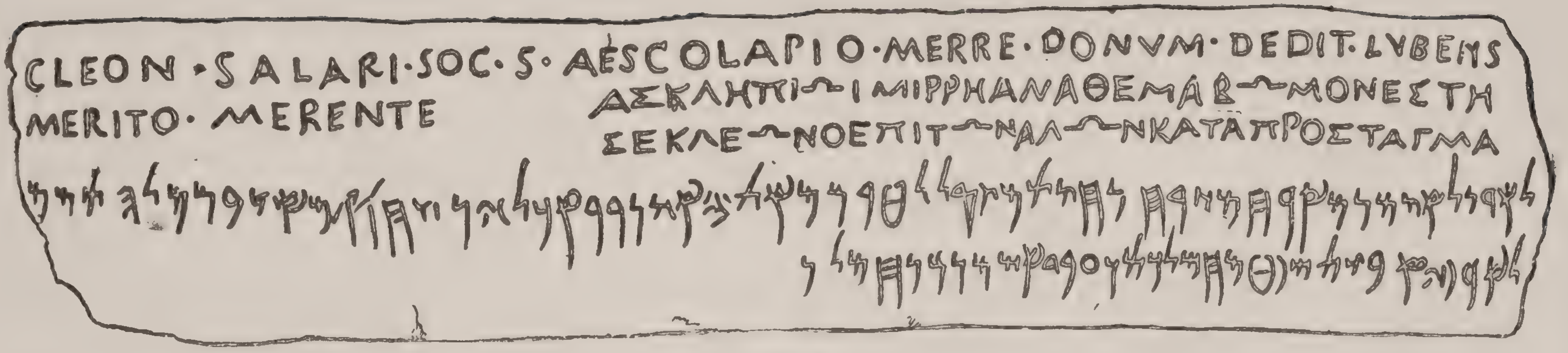

CLEON · SALARI · SOC · S · AESCOLAPIO · MERRE · DONVM · DEDIT · LVBENS
MERITO · MERENTE
ΑΣΚΛΗΠΙ∼Ι ΜΙΡΡΗ ΑΝΑΘΕΜΑ Β∼ΜΟΝ ΕΣΤΗ
ΣΕ ΚΛΕ∼Ν Ο ΕΠΙ Τ∼Ν ΑΛ∼Ν ΚΑΤΑ ΠΡΟΣΤΑΓΜΑ

Fig. 2.

The first (Latin) division, consisting of 1¼ lines, reads: 'Cleon. Salari[orum] . Soc[ietatis] . S[ocius, odalis] . Æscolapio . Merre . Donum . Dedit . Lubens . Merito . Merente.'

The second (Greek) division (two half lines) reads: '*Ασκληπιωι Μιρρη Αναθεμα Βωμον Εστησε* Κλεων Ο *Επι* Των Αλων *Κατα Προσταγμα*.'

The third (Phœnician) division (1½ lines) reads: 'Leadan Leeshmun Maarach Misbach Nechosheth Mishkal Litram Meath [100] Ash Nadar Aklin Shachsag Measher Mimelach Tishm[a K]ola Refia Beshat Sufetim Chamilkat Veâbd Ashmun Ben Chamilk[at].'

a degree that it is often most puzzling to trace the original Semitic words. Phœnician names occur in Suidas, Dioscorides, Apuleius, in martyrologies, calendariums, Acts of Councils, in church Fathers (Augustine, Priscianus, Servus), etc. The only really important remnant of this class, however, is found preserved—albeit greatly mutilated and Latinized—in Plautus's *Pœnulus*, of which act v. s. 1 contains in 16 lines the Phœnician translation of the Latin text, with more than 100 Phœnician words. Several other phrases and words are embodied in act v. ss. 2 and 3 of the same play. Yet, though there is very little doubt among scholars about the greater portion of these texts, the corruption and mutilation which they had to undergo, first at the hands of Plautus, who probably wrote them only from the ear, then at the hands of generations of ignorant scribes, have made more than one word or passage an insoluble puzzle.

Fig. 1, the first of the two specimens of Phœnician [Punic] writing, is taken from one of those Carthaginian votive tablets with which the British Museum (now the wealthiest in Phœnician monuments) has lately been enriched, as mentioned above. The emblems on it are symbolical, and refer to the deities invoked. The lower part is mutilated, but easily supplied. The date is uncertain, perhaps B.C. 2d or 3d c.

Fig. 2 shows a trilingual inscription from a base of an altar, found at Pauli Gerrei, in Sardinia, and fully explained first by Deutsch. (See *Transactions* of the Royal Soc. of Literature, 1864.) Its contents are briefly this: A certain Cleon, Phœnician by religion, Greek by name, Roman by nationality, a salt-farmer, vows an altar—material and weight of which are given only in Phœnician; viz., copper, a hundred pounds in weight—to Eshmun-Æsculapius 'the Healer' (the Phœnician *Mearrach*, clumsily transcribed *Merre* in Latin, and *Mirre* in Greek), in consideration for a cure to be performed. The date, given in Phœnician, viz., the year of two judges, apparently annual, entirely unknown, gives no clew to the time. Paleographical reasons, however, would date it about B.C. 1st c.

Among those who have more or less successfully occupied themselves with Phœnician antiquities, language, and literature, and who have also in some instances deciphered inscriptions, are Scaliger, Bochart, Pococke, Barthelemy, Swinton, Bayer, Dutens, Hamaker, Gesenius, Movers, Munck, Judas, Bargès, De Saulcy, Ewald, Levy, Vaux, Renan, De Luynes, De Vogué, Deutsch, and others; to whose writings, either in special works or scattered in Transactions of learned societies, we refer. Very valuable are Mover's *Phœnizier;* Schröder's *Die Phönizische Sprache;* Renan's *Mémoire* (1860), and his *Mission de Phénicie* (1874); also the relevant portions of the ancient histories of Lenormant, Duncker, and others.

PHŒNICIAN, or PHENICIAN, a. *fē-nĭsh'ĭ-ăn* : pertaining to *Phœnicia*. PHŒNIC'IANS, n. plu. *-ĭ-ănz*, the inhabitants of anc. Phœnicia, the great maritime and commercial people of the anc world.

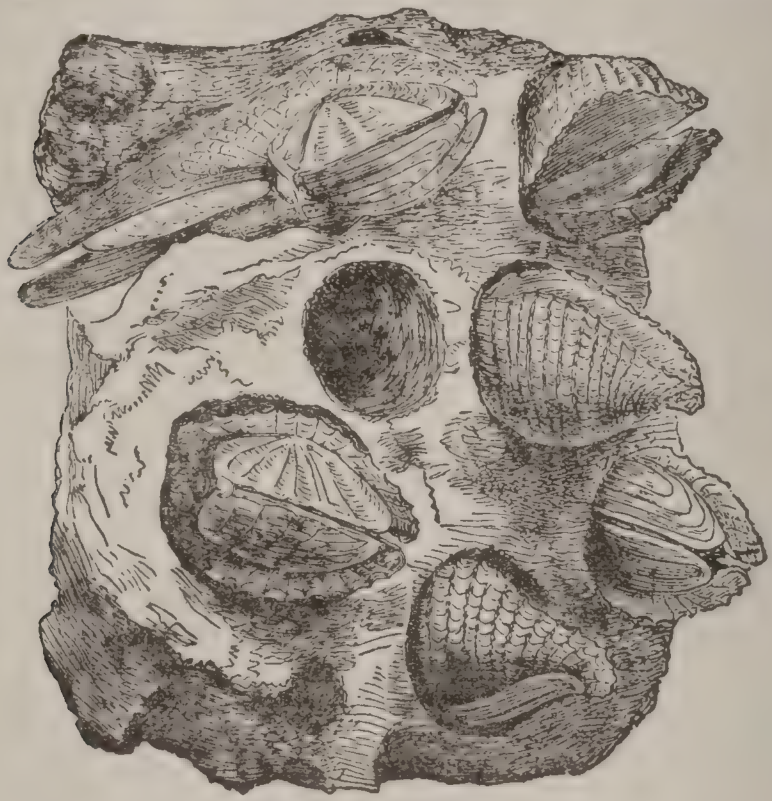
PHŒNICOP'TERUS : see FLAMINGO.

PHŒNIX, *fē'nĭks :* mythical Egyptian bird, supposed by some to be a kind of plover, like the *kibitz*, depicted often with human arms, and called in hieroglyphs *rekh.* Others consider it the *bennu*, or nycticorax, a bird sacred to Osiris, and represented watching in the tamarisk over his coffin. The first of these representations has sometimes a star upon the head, supposed to indicate the astronomical period of its appearance. According to one account, it visited Egypt after the death of its father, and entered the shrine particularly dedicated to it at Heliopolis ; and there buried its parent, putting the body into an egg or case made of myrrh, and then closing up the egg. Another account is, that the P., when about to die, made a nest for itself in Arabia, from which a new P. sprang of itself. This bird proceeded to Heliopolis, and there burned and buried its father. But the more popularly known version is, that the P. burned itself, and a new and young P. sprang from the ashes. A less received version is, that a worm crawled out of the body of the dead P., and became the future P. The P. was, according to the most authentic accounts, supposed to visit Egypt every 500 years ; the precise period, however, was not known at Heliopolis, and was a subject of contention till its appearance. The connection of the Phœnix period with that of the Sothiac cycle appears to be generally received by chronologists, as well as the statement of Herrepollo, that it designated the soul and the inundation of the Nile. A great difference of opinion has prevailed about the Phœnix period ; according to Ælian, it was a cycle of 500 years ; Tacitus seems to make it a cycle of 250 years ; Lepsius, 1,500 years. The P. was fabled to have four times appeared in Egypt : 1, under Sesostris ; 2, under Amasis, B.C. 569–525 ; 3, under Ptolemy Philadelphus, B.C. 284–246 ; lastly, A.D. 34 or 36, just prior to the death of Tiberius. The P. appears also on the coins of Constantine, A.D. 334, 300 years after the death of Christ, who was considered the P. by the monastic writers. It is supposed by the rabbins to be mentioned in Job xxxix. 18, Ps. ciii. 5.—See Herodotus, ii. 73 ; Achilles Tatius, iii. 25 ; Tacitus, *An* vi. 28 ; Tzetzes, *Chil.* v. 397 ; Lepsius, *Einleit.* 183 ; *Archæologia*, xxx. 256.

PHŒ'NIX : see DATE PALM : PALM.

PHOLADIDÆ, n. plu. *fō lăd'ĭ-dē* [Gr. *phōlas* or *phōlăda*, living in dens or caves ; *phōleuō*, I lie concealed] : family of boring bivalves, of which the common Pholas (q.v.) is the type, found fossil from the Lias upward. PHOLADOMYA, n. *fō-lăd'ō-mī'ă* [Gr. *muax*, a mussel] : genus of fossil equivalved shells.

PHOLAS, *fō′lăs:* genus of lamellibranchiate mollusks, of family *Pholadidæ.* This family, to which the Shipworm (*Teredo navalis*) also belongs, has the shell gaping at both ends, thin, white, very hard, sometimes with accessory valves; the two principal valves beset with calcareous inequalities, connected by fine transverse parallel ridges, forming a kind of rasp, used by the animal for boring a hole in rock, wood, or other substance, in which it lives. The animal itself is either club-shaped (as in *Pholas*) or worm-shaped (as in *Teredo*), with large long siphons, often united almost to the end, and a short foot. Several species, natives of British coasts, are popularly called *Piddocks:* they are used for bait, also for food. How the pholades excavate the holes in which they live, sometimes in clay or mud, but often in chalk, and even in much harder rocks, has been the subject of much dispute. An excavating instrument armed with siliceous particles has been ascribed to the animal, but no such instrument exists. The shell is studded with projections, in regular rows, giving it the character of a rasp or file; and the P., fixing itself firmly by its foot, which acts as a sucker, and working itself from side to side, makes use of the rasping power of its shell to enlarge its hole as it has need, so that the hole is always very exactly accommodated to the size of the occupant.



A Piece of Rock Bored by Pholades.

PHOLERITE, n. *fŏl′ér-īt* [Gr. *pholis*, a scale]: a mineral formed of small convex scales of a pearly lustre and of a pure white color, resembling kaolin in appearance; a hydrated silicate of alumina.

PHONENDOSCOPE, *fōn-ĕn′dŏ-skōp*, n. [Gr. *phōnē*, voice, sound ; *endon*, within ; *skopeō*, see] : instrument for discriminating healthy from unhealthy action of physical organs by difference of sound. It is a kind of stethoscope, designed especially for examining internal organs. Its essential principle is much the same as that of the phonograph and the telephone—the duplication by physical means of the minute vibrations on which sounds depend. Minute vibrations, which produce no audible effect in ordinary circumstances, are caught on a thin, circular plate of ferrotype, the same material that is used in telephones. Gathering up these sound-waves, the P. concentrates them into a sort of metal drum. This drum contains a little spring pressing on the vibrator to give it greater play, and has two small holes to admit the sound-waves into its center. On one side is the vibrator, to be laid on whatever part of the body is to be tested ; on the other are two little metallic tubes, fastened firmly in and connected directly with the center. To these tubes of metal are attached long, flexible tubes of rubber, with ear-tips on their ends, intended to be put directly into the ears of the surgeon.

PHONETIC, a. *fō-nĕt′ĭk*, or Phonet′ical, a. *-ĭ-kăl* [Gr. *phōnētĭkos*, vocal—from *phōnē*, a sound]: pertaining to the elementary sounds of the human voice; pertaining to written characters representing sounds; vocal. Phonetics, n. plu. *fō-nĕt′ĭks*, the science of sounds uttered by the human voice, and their various modifications. Phonet′ically, ad. *-lĭ*. Phonics, n. plu. *fō′nĭks*, the art of combining musical sounds; acoustics. Phonic, a. *fō′nĭk*, pertaining to. Phonetic spelling, the art or practice of spelling words with letters or characters representing the manner in which they ought to be pronounced. Phonetic writing (see Phonetic Alphabet, below).

PHONETIC AL′PHABET, *fō-nĕt′ĭk:* system of symbols representing the elementary sounds of language. All alphabetic writing is essentially phonetic. The invention of letters was the invention of phonetic writing, as distinguished from the older pictorial, or ideographic, writing. From a variety of causes, however, no language has ever been perfectly represented by its spelling, and with the lapse of time the divergence has continually increased, since the spoken words are constantly undergoing change, while the spelling tends to remain fixed. In English especially this divergence has been allowed to proceed to such an extreme that it is universally admitted to be a serious evil; and in recent times various schemes have been projected to remedy it. To these schemes of radically reformed spelling the term phonetic writing is now applied; and what follows represents the views and arguments of the promoters of the movement, and sketches its history.

The earliest attempts at alphabetic writing were as strictly phonetic as the limited scheme of symbols allowed, or as the limited aim of writers required. The alphabets were confined almost exclusively to consonants; and the analysis of speech on which they were based was confined in each case to the language for which the alphabet was designed. When any old alphabet, therefore, came to be adopted for a new language or dialect, it would be found deficient in means for writing any sounds not used in the language for which the alphabet was originally intended. Unless, then, new symbols were added for the new sounds, these latter must have been represented by conventional combinations of letters; and at this point the writing would cease to be perfectly phonetic.

The Sanskrit language furnishes convincing proof of the original phonetic character of alphabetic writing; for not only were words written exactly as they were sounded, but every change which a word underwent in utterance was consistently indicated by a change in the writing. Notwithstanding this fact, there is no language in which the etymological and grammatical relations of words are more clearly exhibited or easily traced than in Sanskrit. The English language illustrates the same principle. No difficulty is experienced in discovering the relation between *loaf* and *loaves*, *wife* and *wives*, notwithstanding the change of *f* into *v* in the plural; nor would any difficulty be created though the *s* also were changed, as it is in sound, and the words written as they are pronounced—lōvz, wīvz.

The English language embraces in its dialects almost all the elementary sounds of all languages; and the Latin alphabet, which was adopted for English writing, was so insufficient in the number of its characters, that many new letters would have been required to adapt it for representation of Anglo-Saxon and other words. But instead of being extended, the Latin alphabet was reverentially accepted with all its imperfections; its deficiencies were supplemented by use of servile or silent letters, and by various orthographical expedients; thus our writing came to be irregular, difficult, and fluctuating. The great inconvenience, however, of representing by the same character the two sounds of U and V, led to the introduction of U as a new letter for the vowel sound, and to the limitation of V to the consonant sound; and the further ambiguity arising from the want of an appropriate sign for the sound of W led to the invention of that symbol, which, being formed by joining together two of the old V characters, was thence called 'double V'—pronounced, according to the old sound of V, 'double U.' The phonetic principle was fully recognized in these changes; and they furnish precedent for further changes, when a necessity for them shall be sufficiently felt and acknowledged.

There can be no doubt that phonetic writing would greatly facilitate acquisition of the power of reading, and consequently would facilitate the education of children and illiterate adults; as well as tend to reduce dialects to one common standard, and further the diffusion of our language in foreign countries. To learn to read from perfectly phonetic characters would be merely to learn the alphabet, and to spell would be merely to analyze pronunciation. A child at school might be made a fluent reader in a few weeks. All uncertainty of pronunciation would vanish at the sight of a word, and dictionaries of pronunciation would be superfluous.

Of all the languages which employ the Latin alphabet, the English is the worst represented; in some measure because of the rich variety of its phonic elements, but chiefly because, of all the nations which have adopted Latin letters, the English have done least to make their writing phonetic. Every attempt to correct the anomalies of our orthography has roused a host of prejudices, either learned or ignorant, against which the efforts of private individuals have been powerless. The difference between phoneticians and their opponents seems a fundamental difference as to what really constitutes a word. The former, maintaining the *sound* to be the true word, would discard all associations dependent on mere letters, in order to represent the exact sound in the simplest manner; the latter, clinging to the literal associations of orthography, argue as if the verbal cluster of *letters* in reality constituted the word. The dispute is thus, in effect, between letters and sounds: which are the signs—which are the thing signified?

In phonetic writing, the eye would no doubt confound such words as *know* and *no*, *see* and *sea*, *sighs* and *size*, when written separately, as in a vocabulary; but it cannot be supposed that such words would present more ambiguity in contextual usage than they now do in utterance, subject to the same confusion to the ear. At present, we have, in fact, two languages—one purely phonic, addressed to the ear; and the other, in some degree etymological or historical, addressed to the eye. In this respect, we are in a position similar to the Chinese, with their classical ideographic language of literature, and their multitudinous vernacular dialects. To establish the assertion that the phonic word (the sound) written phonetically in a sentence would be less intelligible to the eye than the written word in its present form, it is incumbent on the opponents of phoneticism to show that the simple phonic word is now less intelligible when pronounced in a sentence than its written symbol is when read in a sentence.

The principal objection urged against phonetic writing is, that it would obscure the etymological history now discoverable in the orthography of a word. The best answer to this objection is, that the traces of etymology, preserved in the present spelling, are so imperfect and inconsistent as to be of little value compared with the embarrassments that they occasion in other respects. Further, they can be shown to be at times even misleading as to etymology.

The first requisite for construction of a phonetic alphabet is an exact knowledge of elementary sounds, that every element may be provided with its appropriate symbol, and that no more symbols may be introduced than there are distinct elementary sounds. The latter consideration would be of importance only in connection with a general alphabet available for all languages. An alphabet for any individual language might contain symbols for compound sounds, with no other disadvantage than that of adding to the number of symbols. It would not, for instance, be of any consequence, so far as phonetic writing is concerned, whether the word *sacks* were represented by the letters *saks*, *sacs*, or *sax*, if the symbols used were invariably appropriated to the same sounds. Orthoepists and phoneticians are not agreed as to what elements compose many of our compound sounds, such as those heard in the words *chair*, *queen*, *tune*, *I*, *out*, etc. Any attempt, therefore, at representing compounds analytically would be premature, until the analysis of the compounds had been settled. This analysis would be absolutely necessary for a general alphabet for all languages, but not so for an alphabet for any single language. Phonetic writing, then, should be considered separately—(1) as a means of representing the elementary sounds of all languages; (2) as a method of symbolizing the pronunciation of any one language only. We are now to consider the attempts that have been made for phonetic writing of English.

Dr. Franklin, 1768, proposed a P. A. for English, in which new symbols were introduced for the vowels heard in the words *on* and *up*, and the four consonants heard in the words *she*, *they*, and *thing*. Many other schemes have been from time to time proposed; but the only alphabets which have been practically applied on a large scale are those of Dr. Comstock in the United States, and Messrs. Ellis and Pitman in England. The object of experimenters in this department has generally been to make use of existing letters as far as possible, using new forms only to supplement deficiencies. The common alphabet has been made to furnish almost a sufficient number of characters by the inversion of some of its letters—thus, ʌ, ɟ, ɐ, ɔ, ə, ᵷ, ɥ, etc., as in the 'Anti-absurd' alphabet of Major Beniowski; but the best scheme of phonotypes yet offered was the joint production of Isaac Pitman, inventor of the first system of phonetic shorthand writing, and A. J. Ellis, B.A. of Cambridge, an accomplished mathematician and linguist. This alphabet was completed 1847; and the experiment of its introduction was made with great diligence and perseverance by its promoters, until an army of philanthropic assistants became enlisted in all parts of Great Britain and America. Primers and schoolbooks were issued, and tested on juvenile and adult classes; many works of standard literature, and even the entire Bible, were translated into the new spelling; magazines were published; and ultimately a newspaper, printed in the phonetic character, was started by the enterprising orthographic reformers. In this scheme of phonotypes, diphthongal and articulate compounds were not analyzed, and the letters of the ordinary alphabet were retained in their most common signification, 17 new characters being introduced for unrepresented or ambiguously written sounds. The forms of these were, in most cases, happily suggestive of the displaced orthography, and the general aspect of the writing bore such a resemblance to common typography, that any good reader of the latter could decipher the new printing with ease, after very brief study of the alphabet. The ordinary vowel letters (A, E, I, O, U) were pronounced as in the words *am*, *ell*, *ill*, *on*, *up;* the consonants C and G were sounded as in *came* and *game;* the letters K, Q, X, were rejected as superfluous, and all the other letters of the common alphabet were retained, with their established sounds. Comparing this scheme of letters with the tabulated elementary sounds of English, we find that it represents all the vowels, except the nice varieties heard in the words *air*, *ore*, *err*, *ask;* and that all the consonants are accurately represented except *wh*. The latter element is written by letters sounding *hoo*, so that the words *where* and *whoe'er* are made identical to the eye; and the sentence, 'I saw the man *whet* the knife,' is written, 'I saw the man *who ate* the knife.'

Notwithstanding these imperfections, this alphabet was found to work well among those disposed for a reform. The phonetic method was proved remarkably simple and easy in comparison with the ordinary system; the time occupied in making fluent readers was greatly reduced; and readers of phonetic printing experienced little difficulty in the transition to reading from the common orthography.

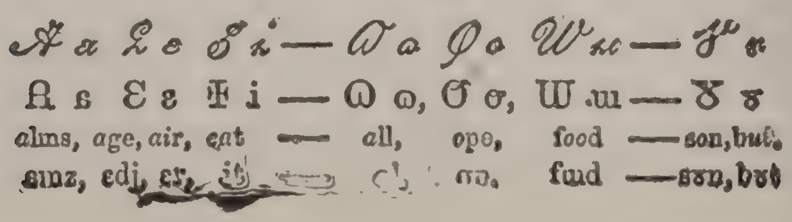
The advantages claimed for the system were chiefly: rapidity of learning to read, certainty of pronunciation, and increased facility in common reading, after the power of phonetic reading had been acquired. The chief disadvantages alleged against the system were: accustoming the eye to a false orthography, and teaching what had to be in great part unlearned after it was acquired. Whether the objectors were right or wrong, they were overpoweringly numerous, and the system failed to do more than prove that phonetic spelling greatly simplifies the acquisition of the power of reading.

The original phonotypic alphabet, described above, has been for some years discarded in the printing issued from the 'Phonetic Institution' (Bath, England), and a more analytic alphabet has been adopted, in which 11, instead of 17, new forms are introduced. The latest edition of this alphabet gives the ordinary vowel letters A, E, I, O, for the sounds in the words *am*, *ell*, *ill*, *on*, and the letter U for the sound in *pull;* K is restored, and C rejected; J is used as in French; and the elementary sound of *wh* is still unacknowledged. The 11 new characters represent the consonants in the words *she*, *oath*, *they*, and (s)*ing;* and the vowels in the words *ale*, *eel*, *alms*, *old*, *all*, *pool*, *up*.

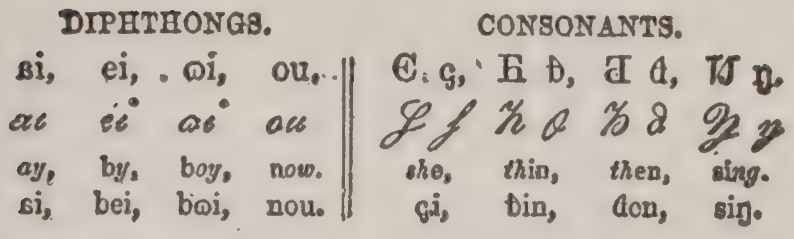
The following are the forms of the new letters as printed and written, with a passage exhibiting their appearance in composition.

This Phonetic Alphabet consists of 34 letters—viz., the 23 useful letters of the common alphabet (*c*, *q*, and *x* being rejected), and the 11 new ones below. *J* is used for the French *j* (zh), or *g* in 'edge,' or *s* in 'vision;' hence *dj* represents *J* in *John*, and *dg* in *edge*. *Tc* (*t sh*) represents *ch* in *chess*, and *tch* in *catch*. *Y* and *w* are consonants; *wh* being replaced by *hw*. The vowels *a*, *e*, *i*, *o*, *u*, have invariably the short sounds heard in *pat*, *pet*, *pit*, *pot*, *put*. All the other old letters have their usual signification. The italic letters in the words in the third line denote the SOUNDS of the letters.

VOWELS.



PHONETIC ALPHABET.



DIPHTHONGS.				CONSONANTS.			
ɛi,	ęi,	ωi,	ou,	Ͼ ç,	Ħ ƀ,	Ǝ đ,	Ŋ ŋ.
ai	*ei*	*ωi*	*ou*	*Ͼ ç*	*Ħ ƀ*	*Ǝ đ*	*Ŋ ŋ*
ay,	*by,*	*boy,*	*now.*	*she,*	*thin,*	*then,*	*sing.*
ɛi,	bęi,	bωi,	nou.	çi,	ƀin,	đen,	siŋ.

The double letter *u*, as in *unit, unite, duty, value,* is written thus: 'yɯnit, yuneit, diɯti, valiu.' When *ai, ωi,* make a *dissyllabic* diphthong, the second letter is marked with a diæresis; thus, *solfaïŋ, sωïŋ.*

"'Tiz đe meind đat mɛks đe bodi ritç;
and az đe sɜn brɛks ƀrɯ đe darkest kloudz,
sσ onor 'pireƀ in đe minest habit.
ʕ Hwot! ʕ iz đe djɛ mσr preçɜs đan đe lark,
bikωz hiz feđerz ar mσr biɯtiful;
or ʕ iz đe ader beter đan đe il,
bikωz hiz pented skin kontents đe ei.
Ō nσ, gud Kɛt; neiđer art đou đe wɜrɜ
for đis puɯr fɜrnĩtiur and min arɛ.'

The reduction in the number of letters from that in the Ellis and Pitman alphabet is obtained chiefly at the expense of the phonetic *principle*, in the attempt to analyze diphthongs in writing, before their correct phonic analysis has been ascertained and settled. A method has been proposed by Melville Bell, in which the advantages of phoneticism might be secured, so far as simplifying the acquisition of reading is concerned, without alphabetic change. Thus the orthography and sound are shown together when the words *loaf, debt, wife, wreath, straight*, etc., are printed lo^{a}f, de^{b}t, wif^{e}, ^{w}re^{a}th, stra^{igh}t, etc.

But the question recurs: Why should established orthography be unphonetic? Or, at least, why should not some national measures be adopted to correct the anomalies of our spelling? A similar work was undertaken by the Spanish Acad. in the middle of the 18th c., and carried out so efficiently that, at the present day, the pronunciation of any word in Spanish is immediately determined with certainty by every reader who knows merely the phonetic value of the alphabetic characters. The writing of the Italian, Dutch, and many other languages also has been successfully phoneticized. A similar result would be attained in English if the work of orthographic revision were submitted to a competent tribunal, and if such changes as might be found necessary were duly sanctioned by authority. New letters should be added to the alphabet for the six unrepresented simple consonant sounds, Sh, Zh, Th, Dh, Wh, Ng; or, at all events, the writing of these elements should be made distinctive; and, with a few rules for distinguishing the vowel sounds, little alteration of spelling would be needed to approximate the writing of English to phonetic accuracy.

A general phonetic alphabet, available for the writing of all the sounds of human speech, is still a scientific desideratum. Such an alphabet would be of great practical value to travellers, colonists, missionaries, and philologists. Much attention has been given to this subject of late years. In 1854 a conference of philologists was held in London, at which two rival alphabets were produced, one by Prof. Lepsius of Berlin, the other by Prof. Max Müller of Oxford. The former has been adopted by the Church Missionary Soc., but so many local diversities in the value of the characters have been found necessary in different countries, that this 'Universal Alphabet' has been practically split up into several alphabets. The writing is, besides, overladen with diacritical points. In the alphabet of Prof. Max Müller, the latter difficulty is obviated by a free use of compound letters. The *Lectures on the Science of Language* by this author may be consulted with great advantage, both as to the physiology of speech and as to the history of words. In the second series of these Lectures are given diagrams of the organic formation of many of the elements of speech, as well as a comparative table of four alphabets that have been used in the transcription of Sanskrit, and numerous references to the works of continental and other writers who have treated of the science of phonetics.

The most elaborate scheme of a universal alphabet hitherto published is that of A. J. Ellis. In this alphabet 94 sounds are discriminated by means of an ingenious system of compound letters, but the complexity of the writing forbids its 'universal' adoption.

The chief difficulty in construction of a universal alphabet has arisen from lack of a complete classification of elementary sounds; another difficulty has been created by adherence to the inadequate letters of the Roman alphabet. The resolutions of the alphabetic conference were decidedly in favor of Roman letters as the basis of the proposed 'standard' alphabet. But the wisdom of this decision is questionable. No existing alphabet exhibits the natural relations of the sounds that it represents; consequently, though an alphabet physiologically complete were framed, it could not incorporate Roman, Greek, or any other letters at present in use, without sacrificing the most essential qualities of a universal alphabet—simplicity and congruity. Symbols must be devised which would indicate to the eye all the organic relations discoverable by the ear between the various elements, and which would be free from the associations that would attach to adopted letters familiar to the eye with other meanings. This principle has been carried out in the system of *Visible Speech* (q.v.) by Melville Bell.—For phonetic shorthand writing, see SHORTHAND.

PHONOCAMPTIC, a. *fō'nō-kămp'tĭk* [Gr. *phōnē*, sound; *kamptō*, I inflect]: having power to inflect sound, or to turn it from its direction.

PHONOGRAM, n. *fō′nō-grăm* [Gr. *phōnē*, sound; *gramma*, a letter—from *graphō*, I write]: the articulate speech, or musical sounds, as recorded by the phonograph.

PHONOGRAPH, n. *fō′nō-grăf* [Gr. *phōnē*, sound; *graphō*, I write]: mark or letter indicating a distinct spoken sound: remarkable instrument of recent invention which records articulate speech, or musical sounds, on tinfoil, and reproduces them at any subsequent period of time (see below). Pho′nograph′ic, a. *-grăf′ĭk*, or Pho′nograph′ical, a. *-ĭ-kăl*, pertaining to; representing articulate sounds. Pho′nograph′ically, ad. *-lĭ*. Phonography, n. *fō-nŏg′ră-fĭ*, the art of representing each of the sounds of speech by a distinctive mark or character; a system of Shorthand (q.v.) writing. Phonog′raphist, n. *-fĭst*, one who explains the laws of spoken sounds. Phonog′rapher, n. *-fėr*, one versed in the art of phonography. Phonometer, n. *fō-nŏm′ĕ-tėr* [prefix *phono-;* Eng. *meter*]: an instrument for ascertaining the number of vibrations of a given sound in a given space of time. Phonomotor, n. *fō-nŏm′o-tėr* [prefix *phono-;* Eng. *motor*]: instrument to illustrate the motive-power of sound; by its means the human voice may be made to perform mechanical work. Phonorganon, n. *fōn-awr′ga-nŏn*, or Phonor′ganum, n. *-nŭm* [prefix *phon-;* Gr. *organon*, an organ]: instrument designed to imitate vocal sounds of speech; a speaking-machine.—*Phonograph*, the apparatus invented in 1877 by Thomas A. Edison (q.v.), differs from the vibrograph and phonautograph. The latter are constructed to record sound-vibrations graphically, while Mr. Edison's invention, properly called the 'Talking Phonograph,' obtains a record by which the sound-vibrations resulting from articulate speech can be mechanically reproduced after any lapse of time. As originally made, the instrument consisted of three parts—the sender, the receiver or recorder, and the transcriber. The sender consisted of a tube, having an open mouthpiece at one end, and bearing at the other end a thin diaphragm of metal or other substance, with a sharp point or style affixed to the centre of its outer surface. The second apparatus consisted of a cylinder, about four inches in diameter, having on its periphery a V-shaped groove cut spirally from end to end. Over this grooved cylinder a sheet of tinfoil was placed, and the sender advanced till the point of the style lightly touched the tinfoil, over the opening of the V-shaped cut. While the words to be recorded were spoken or sung, the cylinder was turned rapidly, the apparatus for moving it giving a lateral as well as a circular motion. The point of the style thus traversed the tinfoil spirally from end to end, and the vibrations in the diaphragm caused by the sounds resulted in a series of indentations in the tinfoil. To reproduce the sounds, the cylinder was again presented to a style attached to a diaphragm, the style being pressed against the tinfoil by a slight spring. The cylinder was then made to re volve, and the motion of the style upon the inequalities in the indented tinfoil produced vibrations in the diaphragm corresponding to the sound-caused vibrations originally created in the instrument by the voice. The sounds were thus reproduced with great exactness, but with a softening of the consonants altering to some extent the character of the voice.

The modern phonograph has been introduced as a practical instrument. It differs from the original in many respects. The rotation of the cylinder is automatically governed, and is effected either by foot-power, water-power, or by an electric motor driven from the lighting circuit, or by storage or primary battery. The recording cylinder is hollow, and made of a secret composition resembling wax. It is about 2 inches in diameter, and 4 inches long. The diaphragm, used both for recording and reproducing, is of thin glass. The two styles connected to its centre are of sapphire. The impressions are made directly on the wax cylinder, and are reproduced therefrom. One stylus is used for recording, and the other for reproducing. The cylinder travels longitudinally at the rate of $\frac{1}{100}$ inch for each revolution. One cylinder is sufficient for a long business letter. The sound produced is low, but very distinct. The same cylinder can be used for a great number of reproductions, a good cylinder giving 500 repetitions. If a new inscription is to be recorded, a little planing tool is thrown against it, which planes off the wax in advance of the recording stylus. Thus the cylinder, if used for new work, gradually grows thinner or of less diameter; but as each cut is of microscopic depth, the diminution is immaterial. The cylinders can be sent by mail so as to answer the purpose of a letter, the recipient simply placing them on his own phonograph. Many interesting records of the voices of great singers, orators, statesmen, and others, have been thus obtained and preserved. Hitherto no practical success has been attained in making new cylinders from old ones.

PHONOLITE, n. *fō'nō-līt* [Gr. *phōnē*, sound; *lithos*, a stone]: variety of basalt or greenstone, which rings or clinks with a sort of metallic sound when struck by the hammer; called also *clinkstone:* see Clink-stone: Felspar.

PHONOLOGY, n. *fō-nŏl'ō-jĭ* [Gr. *phōnē*, sound; *logos*, discourse]: the science of articulate sounds; a treatise on the elementary sounds of speech; phonetics. Phonological, a. *fō'nō-lŏj'ĭ-kăl*, pertaining to.

PHONOMA'NIA: see Homicide (Homicidal Mania).

PHONOTYPY, n. *fo-nŏt'ĭ-pĭ* [Gr. *phōnē*, sound; *tupos*, a type—from *tuptō*, I strike]: a method of representing each of the sounds of speech by a distinct printed character or letter. Phonotype, n. *fō'nō-tīp*, a printed letter or character representing a sound of speech.

PHORANTHIUM, n. *fō-răn′thĭ-ŭm* [Gr. *phorĕō*, I bear, I carry; *anthos*, a flower]: in *bot.*, a term applied to the receptacle of composite flowers.

PHORMINX, n. *fŏr′mĭngks* [Gr.]: ancient Greek lyre or lute.

PHORMIUM, n. *fŏr′mĭ-ŭm* [Gr. *phormos*, a mat made of flags or rushes]: a genus of plants, the leaves of which furnish fine, silky, and very strong fibres; New Zealand flax, ord. *Liliac′eæ.*

PHOSGENE, n. *fŏs′jēn* [Gr. *phōs*, light; *gennaō*, I produce]: luminous impression produced by pressure on the eyeball; term used in *Encyc. Brit.* A P. usually appears as a luminous centre surrounded by colored or dark rings. Sometimes it seems to consist of bright scintillations of various forms. Similar appearances may be observed at the moments of opening or closing a strong electric current transmitted through the eyeball: see EYE. PHOS′GENE, or PHOS′GENE GAS, or CAR′BONYL CHLO′RIDE ($COCl_2$), colorless, pungent, suffocating gas, formed by exposing equal volumes of carbonic monoxide and chlorine to the direct action of the sun, when they combine and become condensed to one-half their joint volume. It possesses no acid characters, but water decomposes it into carbonic and hydrochloric acids, as is shown by the equation $COCl_2 + H_2O = CO_2 + 2HCl$.

PHOSPHATE, n. *fŏs′fāt* [from *phosphorus*]: a compound of phosphoric acid with a base, of which phosphate of lime is one (see PHOSPHATES, in Physiology). PHOSPHATIC, a. *fŏs-făt′ĭk*, pertaining to phosphate; applied to an acid liquor of an oily nature resulting from the slow oxidation of phosphorus in the air. PHOSPHATIC NODULES, in *geol.*, certain concretions or nodules of phosphate of lime found in layers and bands in the upper greensands of the chalk formation, used, when ground, in the preparation of manures. PHOSPHATE OF LIME, a whitish earthy substance consisting of lime and phosphoric acid, occurring in commerce as bone-ash. SUPERPHOSPHATE OF LIME, the phosphate ground to powder and dissolved in sulphuric acid; ground bones dissolved in sulphuric acid; a phosphate containing more phosphorus and less lime than the common phosphate.

PHOS'PHATE ROCK: any rock containing a large amount of phosphoric acid. A massive aluminium phosphate, called 'rotondo-mineral' (Redonda), forms a large deposit on the W. India island Redonda. Phosphorite is a name given to impure, amorphous apatite (which is a lime phosphate), found sometimes in considerable quantities as beds, nodules, or veins, and containing 25 to 80 per cent. of phosphate, or, as in Westphalia, forming 20 per cent. of a phosphoritic slate. Coprolites are an impure lime phosphate. The phosphate beds (pyroclasite) of S. Carolina underlie a large area, at depth of 1 to 12 ft., and are estimated as yielding 500–1,000 tons to the acre; masses are taken also from the Ashley and Cooper rivers. Extensive detached beds of P. R. have been discovered in Fla., underlying portions of the cos. of Alachua, Levy, Marion, Citrus, Hernando, Pasco, Hillsborough, Polk, and De Soto. The beds seem the eroded remains of a limestone layer phosphatized by guano when Fla. was a long narrow peninsula or archipelago, during the middle Tertiary. It occurs also as great sheets of conglomerate derived from the limestone, and as rich river drift. Fair limestone samples average 83 per cent. phosphate of lime, and the conglomerate 73–78 per cent. Two districts in Canada—one in Ottawa co., Quebec, and the other in the cos. of Leeds, Lanark, and Frontenac, Ont.—possess large and valuable deposits of P. R. The revenue to the state from royalties on P. R. taken from river-beds in S. C. 1889 amounted to $212,101.96, on 212,101 tons.

The origin of P. R. is matter of controversy. The theory of Prof. Charles U. Shepard was that the eocene shell-marls were formerly above their present level, receiving deposits of guano and vegetable debris; then depressed, the carbonic acid of the waters dissolving out portions of the soil and the marl beneath, leaving cavities and basins that received deposits of the leached guano, mingled with other substances. Similar stone-guano on Mong's Island, in the Caribbean Sea, is known to originate from the deposits of sea-birds; also on the Mosquito Coast. The Redonda phosphate differs from this, and from that of other W. India islands; it resembles an earthy opal, is grayish, yellowish, or white, often translucent: analysis has yielded percentages of about 43 phosphoric acid, 16 alumina, 14 iron.—See Superphosphate of Lime.

PHOSPHATES, in Physiology: compounds of phosphoric acid with a base; of which the following have an active part in the chemistry of the animal body. For the means of distinguishing between the salts of tribasic, bibasic, and monobasic phosphoric acids, see PHOSPHORUS.

Phosphate of Soda may occur under any one of the three forms $3Na_2O{\cdot}P_2O_5$, or $2Na_2O{\cdot}H_2O{\cdot}P_2O_5$, or $Na_2O{\cdot}2H_2O{\cdot}P_2O_5$. All these salts are soluble in water; and the first two have an alkaline reaction, while the third is acid. By exposure of the second of these salts ($2Na_2O{\cdot}H_2O{\cdot}P_2O_5$) to a red heat, it is converted into what is termed *pyrophosphate of soda* ($2Na_2O{\cdot}P_2O_5$), in which the phosphoric acid is obviously no longer tribasic, but bibasic; and by similarly treating the third of these salts ($Na_2O{\cdot}2H_2O{\cdot}P_2O_5$), we convert it into the so-called *metaphosphate of soda* ($Na_2O{\cdot}P_2O_5$), in which the phosphoric acid is monobasic. It is in consequence of these changes, under the action of heat, that the terms *pyrophosphoric* and *metaphosphoric* have been used as synonyms for *bibasic* and *monobasic phosphoric acids.* Phosphate of soda, in one or other of the above forms, occurs as a constituent of all the animal fluids and soft tissues of the body, but is abundant especially in the urine and the bile. There are reasons for believing that it is the second and third of these salts which occur as constituents of the animal body, though the first may possibly sometimes be found. Pyrophosphate and metaphosphate of soda are often found in the ashes of animal fluids or tissues after the process of incineration, but they result merely from the action of heat on the two other salts. The following remarks on the derivation, elimination, and physiological importance of the phosphates of soda, are applicable equally to the corresponding salts of potash always associated with them. The phosphates of the alkalies, which occur in the animal body, obviously owe their origin, either directly or indirectly, to the food—viz., directly, by being ingested as phosphates of the alkalies; or indirectly (within the system), by the action of phosphate of lime on salts of the alkalies. The elimination of these salts from the system is necessary, because they are being constantly supplied by the food; and this process is effected mainly by the kidneys and the intestinal canal. In the carnivorous animals, whose blood is much richer in phosphates than that of herbivora (the ash of the blood of the dog, e.g., contains 12 to 14 per cent. of phosphoric acid; while that of the ox or sheep does not contain more than from 4 to 6), these salts are carried off by the urine; but in consequence of the formation of free acids as products of disintegration of the tissues, a portion of the base is abstracted from the originally alkaline phosphates, and a corresponding portion of phosphoric acid is liberated. The originally alkaline salt is thus rendered neutral or even acid; and the occurrence of the acid phosphate of soda, $Na_2O{\cdot}2H_2O{\cdot}P_2O_5$, in the urine is thus explained.

In the herbivorous animals, on the other hand, the urine contains no phosphates, the whole of the phosphoric acid taken in their food being eliminated by the intestinal canal in the form of the insoluble phosphates of lime and magnesia. Although the general distribution of the phosphates of the alkalies in the nutrient fluids (there is 40 per cent. of them in the ash of the blood-cells; 28·4 per cent. of phosphoric acid and 23·5 of potash in the ash of cows' milk; and about 70 per cent. of phosphoric acid in the ash of the yolk of egg) is in itself an indication of their importance, the exact nature of their functions is not understood. Liebig has specially drawn attention to the peculiar grouping of the acid and alkaline fluids of the animal body. The permanence of this grouping is maintained, especially in herbivorous animals, chiefly by the conversion, within the body, of alkaline and neutral phosphates into acid phosphates by the means above described. Moreover, all tissue-forming substances (the protein bodies) are so closely connected with phosphates, that they remain associated during the solution and subsequent re-precipitation of these substances; and the ash of developed tissues (e.g., muscle, lung, liver, etc.) always affords evidence that acid phosphates existed in the recent tissue; and, further, no exudation from the blood-vessels can undergo transformation into cells and fibres, i.e., become organized, unless, in addition to other conditions, phosphates are present. Another convincing proof of the share taken by the phosphates in the formation and functions of the tissue is the fact that, though herbivorous animals take up a very small quantity of phosphates in their food, and though their blood is very poor in these salts, their tissues contain as large a proportion of phosphates as the corresponding parts of Carnivora. Lastly, the fact that one equivalent of the alkaline phosphate of soda ($2Na_2O·H_2O·P_2O_5$) possesses the property of absorbing as much carbonic acid as two equivalents of carbonate of soda leads to the belief that the power of attracting carbonic acid, which the serum of the blood possesses, is due at least as much to the phosphate as to the carbonate of soda; and that, consequently, phosphate of soda has an important part in the respiratory process.

Phosphate of Lime occurs in the organism in two forms—viz., as the neutral or basic phosphate, $3CaO·P_2O_5$, and the acid phosphate, $2CaO·H_2O·P_2O$. The neutral phosphate occurs in all the solids and fluids of the body, but is most abundant in the bones, in which it amounts to about 57 per cent., and in the enamel of the teeth, 80 to 90 per cent. It is remarkable that a salt so perfectly insoluble in water as neutral phosphate of lime can be held in solution in the animal fluids. In some fluids, e.g., the blood, it is probably, in part at least, combined with albumen, with which it forms a soluble compound; while in other fluids, e.g., the urine, it is held in solution by a free acid or by certain salts (e.g., chloride of sodium), whose watery solutions are more or less able to dissolve it. If any proof is wanted of the functions of this salt in relation to the bones, it is afforded by the well-known experiment of Chossat, who showed that, when too small a quantity of it is taken with the food, the bones lose more or less of their hardness and firmness, and fractures do not readily unite. Phosphate of lime, like the phosphates of the alkalies, is indispensable to cell-formation; e.g., in the mantle of the mollusks (where new cells for formation of shell abound) this salt is far more abundant than in any other part of the body. Although by far the greater quantity of the phosphate of lime found in the body has doubtless pre-existed in the food, yet it is unquestionable that a part of it is formed within the organism by action of carbonate of lime on the phosphoric acid formed during the disintegration of the phosphorus-containing tissues, e.g., the brain. In man and carnivorous animals, a certain portion of the phosphate of lime is eliminated by the kidneys, and the rest is carried off in the excrements; while in herbivorous animals the whole is carried off in the excrements. The acid phosphate of lime is found occasionally in the urine of man and carnivorous animals, but is of no practical importance. For a notice of the amount of earthy phosphates daily eliminated by the kidneys, see URINE.

Basic Phosphate of Magnesia, $3Mg_2O.P_2O_5$, is analogous, both in chemical and physiological relations, to the corresponding salt of lime, with which it is always associated. The abundance of this salt in the seeds of the cereals, and in the other ordinary articles of vegetable diet, sufficiently explains its presence in the system. A far less amount of this salt, than of the corresponding lime-salt, seems required by the organism, as is shown by the relative quantities in which they occur in bone (57 of the former to 1·3 of the latter), and as is further indicated by the fact that, relatively, far more of this than of the lime-salt escapes intestinal absorption, and appears in the excrements.

The only phosphates remaining to be noticed are *phosphate of ammonia and magnesia*, or, as it is sometimes termed, the triple phosphate, $2MgO.NH_4.PO_4.6H_2O$, which occurs in beautiful prismatic crystals in alkaline urine, and indeed in any specimen of urine that is beginning to putrefy; and *phosphate of soda and ammonia*, found occasionally as a crystalline sediment in putrid urine.

PHOSPHAT′IC DIATH′ESIS, in Medicine: condition in which there is a tendency in the urine to deposit *white gravel*. As the deposit of lithates (see LITHIC ACID DIATHESIS) depends on an excessive acidity of the urine, so that of the phosphates is determined by the opposite condition—deficient acidity, or by positive alkalescence. Alkalescence of urine may occur from two distinct causes—viz., (1) from the presence of the carbonate of a fixed alkali (potash or soda), or of alkaline phosphate of soda (see PHOSPHATES, in Physiology); or (2) from the presence of the carbonate of the volatile alkali, ammonia, due to the decomposition of urea. This decomposition is due to the fermenting action of the mucus of the bladder on the urea, and is explained by the equation—

$$\overbrace{CON_2H_4}^{\text{Urea.}} + \overbrace{3H_2O}^{\text{Water.}} = \overbrace{2NH_4.CO_3.H_2O}^{\text{Carbonate of Ammonia.}}$$

The white gravel deposited in the second of these conditions—when the urine contains carbonate of ammonia—is composed of minute shining prismatic crystals of the triple phosphate of ammonia and magnesia (for the formula, see PHOSPHATES). This salt is formed as follows: Healthy urine contains phosphate of magnesia in solution. If, however, the urine become alkaline from decomposition of the urea, a portion of the ammonia combines with the phosphate of magnesia, and forms the triple salt insoluble in the urine, which has now become alkaline. With this triple phosphate, there is almost always an admixture of phosphate of lime ($3CaO.P_2O_5$) in the form of an amorphous precipitate. The tendency to deposit the mixed phosphates (triple phosphate and amorphous phosphate of lime) is observed especially in cases of disease or injury of the spinal cord, and in disease of the bladder, particularly in chronic inflammation of its mucous coat. On allowing urine of this kind, which is usually pale in color, to stand for some time, an iridescent film or pellicle generally forms upon its surface, which, when examined under the microscope, is found to consist mainly of the salts we have described. Such urine speedily becomes putrid, and evolves a strong ammoniacal odor.

The above is by far the most common form of the phosphatic deposits; but the urine may become alkaline from the presence of the carbonate of potash or soda, and then, no ammonia being present, in place of the triple salt, there is a deposition of amorphous phosphate of lime, or, in rare cases, of a crystalline stellar phosphate, $2CaO.P_2O_5.H_2O$. In these cases, the urine is alkaline, pale, copious, slightly turbid, of low specific gravity, and of peculiar odor. This urine makes reddened litmus paper *permanently* blue; while ammoniacal urine causes only a temporary change in the color of the same test-paper. As the urine cools, and sometimes even in the bladder, the white sand is deposited, occasionally giving the last portion of the excreted urine a milky appearance. During perfect health, the urine often becomes temporarily alkaline during the act of digestion (when the gastric juice is especially acid); but a continuous general tendency to alkalescence from a fixed alkali, and therefore to phosphatic deposits, is usually associated with general debility. These deposits occur mostly in sallow, languid, unhealthy-looking persons, whose vital energies have been depressed by mental anxiety, by insufficient food, or by sexual excesses.

In both forms of alkaline urine, and therefore of phosphatic deposits, a generous diet and tonics, such as bark, wine, and the mineral acids (before meals), are of great service; and opium is usually of great value, as judiciously administered by the physician. Small doses of benzoic acid twice or thrice a day, to restore the acidity to the urine, and the occasional washing-out of the bladder with tepid injections, have been found serviceable in the ammoniacal form of the disease.

PHOSPHENES, n. plu. *fŏs′fĕ-nēz* [Gr. *phōs*, light; *phainō*, I show]: luminous impressions and circles seen with the eyelids closed, after the sudden compression of the eyeball: see PHOSGENE

PHOSPHIDE, n. *fŏs′fīd* [from *phosphorus*]: a combination of phosphorus with a metal. PHOSPHITE, n. *fŏs′fīt*, a salt of phosphorous acid.

PHOSPHINE, n. *fŏs′fĭn* [Gr. *phōs*, light; *phainō*, I show]: phosphuretted hydrogen gas, a very poisonous body, consisting of one atom of phosphorus and three of hydrogen.

PHOSPHOR-BRONZE, *fŏs′fŏr-brŏnz* [Eng. *phosphorus*, and *bronze*]: alloy of copper, or of copper and tin (bronze), with phosphorus. The purpose in employing the phosphorus is twofold: first, to remove oxygen (present in the copper in the form of suboxide); secondly, to effect chemical union of the phosphorus with the copper or the bronze. Most commercial copper is contaminated by a small proportion of copper suboxide, which renders it less tenacious and less plastic: all ordinary bronze is subject to like contamination from partial oxidation of the tin; the result is lack of homogeneity and solidity. This oxide is removed by introduction into the fused metal of a carefully proportioned amount of phosphorus, which combines with the oxygen, forming phosphate; the latter is eliminated with the slag. The copper or bronze is thus greatly improved as regards tenacity and plasticity. A small excess of phosphorus, combining with the metal or metals, effects still further improvement. P.-B. containing more than 0·5 per cent. of phosphorus has a color like that of gold, fine grain, high degree of elasticity, and a high breaking-strain.

PHOSPHORES′CENCE: strictly, the phenomenon, exhibited by certain bodies, of remaining luminous in the dark for some time after being exposed to a strong light. In this sense, it is strictly analogous to, perhaps identical with, the heating of bodies by exposure to light or radiant heat. They absorb part of the energy of the vibrations which fall on them; it becomes motion of their particles, and is again radiated from them as light or heat. Certain preparations, such as sulphide of calcium, strontium, or barium, indurated limestone, etc., possess this true phosphorescence in very high degree. With the great majority of phosphorescent bodies, however, the duration of the phenomenon is very short, rarely more than a fraction of a second. P. may also be produced in certain substances, 1, by heating to a temperature much below red heat; examples—fluor spar, lepidolite, quinine; 2, by friction, as in the case of fused calcium chloride; 3, on cleavage, as in the case of mica; 4, on crystallization, as in the case of boracic acid after fusion, and of water when frozen rapidly. Becquerel invented a very ingenious instrument for the study of P., called the *phosphoroscope.* The body to be tried is placed in a small drum, which has an opening at each end. In this drum there revolve two disks, mounted on the same axle, and pierced symmetrically with the same number of holes. They are so adjusted, that when a hole in one disk is opposite to the hole in the corresponding end of the drum, the second disk closes the hole at its end of the drum, and *vice versa.* Light is admitted by one of the holes in the drum, so as to fall on the object, and it is examined through the other hole. It is obvious that when the disks are made to revolve, the object is alternately exposed to light, and presented to the eye. By a train of multiplying wheels, these alternations may be made to succeed each other as rapidly as the observer pleases, and thus the object is presented in the dark to his eye as soon after its exposure to light as may be desired. Almost all bodies are found to be phosphorescent; e.g., some kinds of pink rubies, when exposed to sunshine in this apparatus, appear to glow like live coals in the dark.

Ordinary phosphorus (from which the phenomenon took its name) becomes luminous in the dark by slight friction; e.g., self-luminous figures may be drawn on a wall with a stick of phosphorus or a lucifer match. A similar appearance is presented by putrescent animal matter, such as decaying fish, etc.; but these are effects of slow combustion, or chemical combination, and are not properly classed among the phenomena of phosphorescence: see LUMINOSITY OF ORGANIC BEINGS.

PHOSPHORITE, n. *fŏs′fŏr-īt* [from *phosphorus*]: a mineral containing phosphate of lime, and occurring in veins in certain rocks; also called *apatite.* **PHOSPHORITIC**, a. *fŏs′fŏr-ĭt′ĭk*, pertaining to phosphorite.

PHOSPHORUS, n. *fŏs′fŏr-ŭs* [Gr. *phōsphoros*, light-bringer, the torch-bearer, the morning star—from *phōs*, light; *phorĕō*, I bear or bring]: elementary substance of wax-like consistence, easily made to burn, even by the heat of the fingers or by friction, always luminous in the dark in its ordinary state (see below): a name for the morning star. PHOS′PHORATED, a. *-ā-tĕd*, combined or saturated with phosphorus. PHOS′PHORATING, imp. PHOS′PHORESCE′, v. *-ĕs′*, to give out light in the dark in ordinary temperatures. PHOS′PHORESC′ING, imp. PHOS′PHORESCED′, pp. *-ĕst′*. PHOS′PHORESC′ENT, a. *-ĕs′ĕnt*, shining with a faint light in the dark; luminous. PHOS′PHORESC′ENCE, n. *-ĕs′ĕns*, the state of being luminous without sensible heat (see above). PHOSPHORIC, a. *fŏs-fŏr′ĭk*, or PHOSPHOROUS, a. *fŏs′fŏr-ŭs*, pertaining to or obtained from phosphorus. PHOSPHORIC ACID, an acid containing one equivalent of phosphorus and five of oxygen (see PHOSPHORUS, below). PHOSPHOROSCOPE, apparatus invented by Becquerel, to measure the duration of phosphorescence in substances (see PHOSPHORESCENCE, above). PHOSPHOROUS ACID, an acid containing one equivalent of phosphorus and three of oxygen (see PHOSPHORUS, below).

PHOS′PHORUS (symb. P, at. wt. 31, sp. gr. 1·77): one of the metalloids, or non-metallic elements, although, in its combining relation, it is more closely connected with the metals arsenic and antimony than with any of the members of the sulphur-group, in which it is commonly placed.

This substance affords an excellent example of allotropy; that is to say, it may be made to assume different forms presenting different properties: see ALLOTROPY.

Ordinary P. and the red P. are the only important forms.

P. at ordinary temperatures is an almost colorless or faintly yellow solid substance, having the glistening appearance and consistence of wax, and evolving a disagreeable alliaceous odor, due probably to action of the oxygen of the air upon it. It fuses at 111·5° F. into a colorless fluid; and if the air be excluded, it boils at 536° F., and is converted into a colorless vapor of sp. gr. 62, hydrogen being 1. If, however, it be heated to about 140° F. in the air, it catches fire, burns with brilliant white flame, and is converted into phosphoric acid; indeed, it is so inflammable that it will catch fire at ordinary temperatures by mere friction. As the burns which it occasions are often severe and dangerous, great caution is required in handling it; and because of the readiness with which it catches fire, and of its tendency to oxidize when exposed to the air at a temperature higher than 32° F., it is always kept in water, in which it is insoluble. It is slightly soluble in ether, but dissolves freely in benzol, in the fixed and essential oils, and in carbon bisulphide; and by allowing its solution in one of these fluids to fall upon filtering paper, the finely divided P. absorbs oxygen so rapidly as spontaneously to catch fire as soon as the solvent has evaporated. One of the most characteristic properties of P. is that it shines in the dark, probably from the slow combustion which it undergoes; hence its name. For its power of forming ozone, see OZONE. Taken internally, P. is a very powerful irritant poison; and it is the active ingredient of some of the preparations employed for destruction of vermin. Its fumes give rise to a peculiar form of necrosis of the jaw, frequent among makers of lucifer-matches, and not followed, as in ordinary necrosis, by formation of new bone.

Red P. is prepared from the ordinary variety by heating the latter in a closed iron vessel to a temperature of 464° F. It was discovered by Schrötter 1845, and is a compact solid substance of dark red color and metallic lustre. It differs much in its properties from common P., being devoid of odor; does not shine in the dark, undergoes no change when exposed to the air even for years, and cannot be set on fire by friction or percussion. Moreover, it is insoluble in all the solvents of common P., and is not poisonous. It bears heating to nearly 500° F. without taking fire, and has a specific gravity of 2·10. By using red instead of white P. for lucifer-matches, there is no risk to the health of the operatives. Safety matches ignite on a surface containing a mixture of red P. and sulphide of antimony.

P. is not found in nature uncombined; but it occurs in rocks of various kinds and ages; and in some countries abundantly as apatite or phosphorite, both of which are composed of phosphate of lime. It is found also in the form of coprolites or the dung of extinct animals, and more rarely as wavellite (aluminium phosphate) and vivianite (iron phosphate). In many volcanic rocks apatite is found in minute crystals or particles, and by decomposition of these rocks it passes into the soil. From the soil, it is extracted by plants, which accumulate it (especially in the seeds of the cereals) in quantity sufficient for the wants of the animals which they supply with food. In the animal system, lime phosphate forms 57 per cent. of the bones; phosphates of the alkalies, especially of soda, occur freely in the animal fluids; and in fibrine, albumen, and nervous matter, P. is universally present, though we do not know in what form of combination it occurs.

P. was discovered 1669 by Brandt, a Hamburg chemist, who obtained it from urine. Gahn and Scheele were, however, the first to discover its presence in bone, and to employ that material for its preparation. The following are the leading steps of the usual method for making P. on a large scale: Bones burned to a white ash, or mineral phosphate, apatite, etc., are reduced to powder and mixed with ⅔ of their weight of sulphuric acid diluted with considerable water: this mixture, after standing some hours, is filtered, and the nearly insoluble calcium sulphate is washed. The liquid is then evaporated to a syrupy consistence and mixed with coal-dust, and the desiccation is completed in an iron vessel exposed to a high temperature. The residue, when quite dry, is transferred to fire-clay retorts which are exposed to a red heat. P. rises in vapor, and is conveyed, through a bent tube, into water, in which it condenses in yellow drops. Two distinct processes take place within the retort. The first consists in decomposition of the superphosphate of lime into bone-earth and hydrated phosphoric acid: the second consists in deoxidation, by means of the carbon, of the liberated phosphoric acid into phosphorus—a process accompanied by the evolution of hydrogen and carbonic oxide gases. After being pressed in a fused state through wash-leather, and further purified, it is forced into tubes, in which it is allowed to solidify, giving it the usual form of *sticks*.

P. forms with oxygen an oxide, P_2O_3 (always produced in small quantity when phosphorus is burned in air, but of no practical importance), and three acids—hypophosphorous acid, H_3PO_2, phosphorous acid, H_3PO_3, and phosphoric acid, H_3PO_4. Of these compounds, phosphoric acid is by far the most important.

Phosphoric acid in its anhydrous state, or *phosphoric anhydride*, as it is usually termed, is represented by the formula P_2O_5, and is obtained by burning P. in a jar of perfectly dry atmospheric air or oxygen, when it is deposited in snow-white flakes at the bottom and on the sides of the jar, whence it must be removed by means of a platinum spatula as quickly as possible, because of its attracting moisture from the atmosphere, and placed in a perfectly dry flask. When dropped into water, it combines with it, and dissolves, evolving considerable heat, and emitting a hissing sound as when red-hot iron and water come together. Its strong affinity for water makes this anhydride very useful in the laboratory as a desiccating agent.

There are 3 modifications of phosphoric acid, each possessing the properties of a distinct acid—viz., a monobasic, $H(PH_2O_2)$, a tribasic, H_3PO_4, and a quadribasic, $H_4P_2O_7$. These retain their characteristic properties when dissolved in water, and combine with 1, 3, or 4 equivalents of bases to form salts, according to the acid employed. In the salts formed by the first acid (hypophosphorous), the one equivalent of hydrogen is replaced by one equivalent of base; in those formed by the second acid, 3 equivalents of hydrogen may be replaced by 3 of base, or one equivalent of hydrogen alone may be replaced, while the other 2 remain in the salt; while in those formed by the third acid, all 4 equivalents of hydrogen, or 3, or 2, or only 1, may be replaced by base, so that this acid forms 4 sets of salts. Hence phosphoric acid is what is termed a *Polybasic Acid* (q.v.).

Phosphoric Acid, in agriculture, is an essential elements of plants and a valuable fertilizer. Though it exists in all soils capable of producing plants, it is in few places abundant, and in many cultivated fields it is the first element to become deficient. It appears in the seeds of plants, and is much more likely to become exhausted in fields producing crops which are allowed to mature than it is where the plants are used in a green state. A provision against the waste of this valuable and costly element is seen in its comparative insolubility and its speedy reversion to this form after it has been made soluble by rains or by chemical action. The principal sources of supply are bones, which are used in various forms, but are largely converted into Superphosphate of Lime (q.v.), apatite, Phosphate Rock (q.v.), guano, and fish refuse. It occurs also in wood ashes, and in various other fertilizers.

The occurrence of phosphoric acid (in a state of combination) in the three kingdoms of nature was noticed above. The discovery of the acid was made 1740 by Marggraf; the discovery of its true chemical nature is, however, due to Lavoisier; and that of its various modifications and its polybasicity, to the investigations of Graham.

Phosphorous Acid occurs both as an anhydride, P_2O_3, and as a hydrate, H_3PO_3. *Hypophosphorous Acid* (H_3PO_2) is known only in its hydrated condition, in which it occurs as a very acid, colorless, uncrystallizable syrup.

P. combines with hydrogen in three proportions to form phosphuretted hydrogen gas, PH_3; liquid phosphide of hydrogen, P_2H_4; and solid hydrogen phosphide, P_4H_2. Of these, the first alone requires notice in these pages. It may be obtained pure by heating phosphorous acid in a small retort, the acid being then resolved into phosphuretted hydrogen (phosphorous trihydride) and phosphoric acid: $4H_3PO_3 = PH_3 + 3H_3PO_4$. The gas thus evolved is colorless, and possesses a characteristic fetid odor. When prepared by another process, from caustic potash and P., it possesses the remarkable property of taking fire spontaneously in atmospheric air or in oxygen gas, and of resolving itself into anhydrous phosphoric acid and water. There is reason to believe that, as *perfectly pure* phosphuretted hydrogen gas does not possess the power of igniting spontaneously, the self-lighting gas always contains a minute quantity of the vapor of the liquid phosphide (P_2H_4). The luminous phenomenon known as *Will-o'-the-Wisp* has been referred to the natural evolution of the gas. The compounds of P. with sulphur, chlorine, iodine, bromine, etc., are not of practical importance.

P. is rarely employed in medicine as a nervous stimulant, because of its poisonous properties. The symptoms induced by this poison are those of acute inflammation of the stomach and bowels; the treatment is the administration of large quantities of mild demulcent fluids, and of magnesia. A solution of phosphoric acid in an oil, e.g., almond-oil, and known as *Oleum phosphoratum*, has a place in the U. S. pharmacopœia; but it is rarely employed.

PHOSPHURET, n. *fŏs′fū-rĕt* [from *phosphorus*, on the analogy of *sulphuret*]: a combination of phosphorus with a metal or radical; same as *phosphide*. PHOS′PHURET′TED, a. *-rĕt′ĕd*, combined with phosphorus. Better PHOSPHORET and PHOSPHORETTED.

PHOTALGIA, n. *fō-tăl′jĭ-â* [Gr. *phōs*, light; *algos*, pain]: pain in the eyes, caused by action of light.

PHOTICS, n. *fō′tĭks* [Gr. *pōhs*, *phōtos*, light]: in *nat. science*, that department which treats of light. The term originated in the U. S. Patent Office, where it is applied to mechanical inventions which pertain to illuminating apparatus.

PHOTINIA, n. *fō-tĭn′ĭ-â* [L. form from Gr. *phōs*, light, with reference to the bright, glowy leaves of the plant denoted by the term]: genus of rosaceous plants—shrubs and trees—of the tribe *Pomeæ*. All the species (30) have evergreen leaves, and produce a berry-like pome of –15 cells, with their partitions. The flowers grow in terminal corymbs or panicles, and are usually white. The species are natives of Japan, China, Nepaul, and one is found in California—*P. arbutifolia*, or May-bush, *P. serrulata*, of which there are several varieties, is the Chinese Hawthorn: both *P. serrulata*, and *P. arbutifolia* are hardy evergreens, attaining a height of 10 ft., and are cultivated as ornamental trees for lawns. In Nepaul the bark of *P. dubia* is used as a scarlet dye-stuff.

PHOTINIAN, *fō-tĭn′ĭ-an:* member of a sect led by Photinus, Bp. of Sirmium, 14th c. Photinus, like nearly all the heretics of his time, was influenced by the teaching of Arias on the nature (or natures) of Jesus Christ. He was condemned, 344, by a synod at Antioch as an adherent of the homoousian doctrine, and again 345, by a synod at Milan for having developed the homoousian doctrine in a sense antagonistic to the orthodox doctrine of the divine hypostases.

PHOTIUS, *fō′shĭ-ŭs:* patriarch of Constantinople at a critical period: b. probably between 820 and 825, of a patrician family of Constantinople; d. (as tradition reports) 891, Feb. 6. Distinguished by his abilities, he served in various important public offices, and secured the favor of Emperor Michael and the emperor's uncle and powerful favorite Bardas: in this, his way was opened doubtless by the marriage of his mother's brother to Princess Irene, sister of the empress. The patriarch Ignatius, having in vain, and perhaps too austerely, rebuked Bardas, and then having proceeded to excommunicate him, was deposed and banished under sentence for conspiracy. P., though a layman, was appointed in his stead, was hurried in six days through all the stages of sacred orders, and finally installed as patriarch. Two successive councils of bishops, under court influence, confirmed the deposition of Ignatius and the election of P. Still, great scandal attached to such proceedings, even though P. was known to be one of the finest scholars and the most able theologian in the empire. In 862, however, Pope Nicholas I. (q.v.) called a new council at Rome, which declared P.'s election uncanonical and invalid, deposed and excommunicated him, and reinstated Ignatius in his see. Being supported, however, by the emperor, P. retained possession, and retaliated on the pope by assembling a council at Constantinople 867, in which he raised a controversy of doctrine and discipline between the churches of the East and West themselves. In all these doctrinal differences, the council condemned the Western Church, excommunicated Pope Nicholas and his abettors, and withdrew from the communion of the see of Rome. Michael, having caused the murder of P.'s patron Bardas (866), and being himself assassinated by his colleague Basilius the Macedonian (867), P. was banished to Cyprus (867, about Sep. 30), and Ignatius reinstated (Nov. 23); and 869, Oct., the eighth general council (so regarded by the Latins, but rejected as such by the Greek Church), at which Pope Adrian II.'s legates presided, was assembled at Constantinople, being convened to give indisputable legality to Ignatius's restoration. P. was again condemned and excommunicated, and the intercommunion of the two churches restored. Yet on the death of Ignatius, P. was reappointed to the patriarchate. In 879 he assembled a new and much larger council at Constantinople (claimed by the Greek Church as the eighth ecumenical), renewed the charge against the Western Church, and erased from the creed, in the article on the PROCESSION OF THE HOLY GHOST (q.v.), the word *Filioque* (q.v.). The pope's legates, who attended this council, were disowned by the pope for their concessions; and P. was again excommunicated. Thus began the open hostility between the two churches which has continued till this day: the separation of the churches, however, was not completed till the time of Michael Cerularius: see GREEK CHURCH. P. was finally deprived, degraded, and exiled to Armenia by Leo, son of Basilius, 886; at this point he strangely disappears from history, and is supposed to have died a few years later, in imprisonment. His chief literary remains are (1) *Myriobiblion*, called also *Bibliotheca*, summary review of 279 works which P. had read, many of which are now lost; (2) A *Lexicon;* (3) The *Nomocanon*, which is a collection of the acts and decrees of the councils and ecclesiastical laws of the emperors; (4) Several minor theological treatises; (5) A collection of letters, many of them extremely interesting and elegant. See Hergenröther's monograph on P. (1869).

PHOTO, *fō'tō* [Gr. *phōs* or *phōta*, light]: a common prefix in many compounds, denoting relation to or connection with light: N. a common abbreviation for *photograph* or *photographic picture;* a carte-de-visite.

PHOTOCHRONOGRAPH, *fō-tō-krŏn'ō-grăf* [Gr. *phōs*, light; Eng. *Chronograph* (q.v.)]: instrument for taking photographs instantaneously and at regular (usually very short) intervals, so as to show the different phases of the motions of an object moving, or otherwise undergoing change—e.g., a horse trotting, bird flying, etc.

PHOTOELECTROTYPE, *fō'tō-ē-lĕk'trō-tīp* [Gr. *phōs*, light; Eng. *Electrotype* (q.v.)]: printing-block or plate made mainly with the aid of photography and of the electrotyping process.

PHOTO-ENGRAVING: see PHOTOGRAPHY.

PHOTO-ETCHING, *fō-tō-ĕch'ĭng* [Gr. *phōs*, light; Eng. *etching*]: process of photo-engraving by which a photographed figure transferred to a metal surface is produced thereon by the action of an acid.

PHOTOGALVANOGRAPHY, *fō-tō-găl-va-nŏg'ra-fĭ* [Gr. *phōs*, light; Eng. *galvanography*]: process for obtaining an intaglio gutta-percha plate for press-printing.

PHOTOGEN, n. *fō'tō-jĕn* [Gr. *phōs* or *phōta*, light; *gennăō*, I generate or produce]: in *chem.*, an inflammable hydrocarbon; another name for paraffin oil. PHOTOGENE, n. *fō'tō-jēn*, the generation of a more or less continued picture on the retina from a previous impression, or from a delay of the obliteration of it. PHO'TOGEN'IC, a. *-jĕn'ĭk*, produced or created by light, as a picture, on the retina of the eye. PHOTOGENY, n. *fō-tŏj'ĕ-nĭ*, the art of producing pictures by the action of light. PHOTOGEN'IC DRAW'ING, picture produced by the action of light; photograph: In a restricted sense, figure of a translucent object made by confining it under glass, over a sensitive film, and exposing it to light; the process is much used in reproducing mechanical drawings.

PHOTOGLYPHY, *fō-tŏg'lĭ-fĭ* [Gr. *phōs*, light; *gluphein*, to engrave]: engraving by means of light and chemical action; in particular, the production, by such means, of a plate of letter-press which can be employed in the printing-press like an ordinary electrotype plate. The page of letter-press to be reproduced is photographed on the sensitized surface of a sheet of gelatin, and the resulting impression rendered insoluble under the action of acid. When acid is poured over the sheet of gelatin, it eats away so much of the surface as has not been made refractory by the action of light; thus the letters are made to stand in relief. The gelatin sheet is cemented on wooden blocks after the manner of electroplates, and is used in the ordinary printing-press for printing editions of books.

PHOTOGRAPHY, n. *fō-tŏg′ră-fĭ* [Gr. *phōs* or *phōta*, light; *graphō*, I write]: the art or practice of producing pictures of objects, on chemically prepared bodies, such as glass, paper, etc., by the action of light; sun-painting. PHOTOGRAPH, n. *fō′tō-grăf*, a picture or portrait obtained by the light of the sun. PHO′TOGRAPH′IC, a. *-grăf′ĭk*, or PHO′TOGRAPH′ICAL, a. *-ĭ-kăl*, pert. to or done by photography. PHO′TOGRAPH′ICALLY, ad. *-lĭ*. PHOTOGRAPHER, n. *fō-tŏg′ră-fėr*, or PHOTOG′RAPHIST, n. *-fĭst*, one skilled in the practice of photography. PHOTOGRAPHIC PROCESSES (see below: also PHOTO-PROCESS). PHOTOHELIOGRAPHY (see HELIOTYPOGRAPHY). PHOTOLITHOGRAPHY, n. *fō′tō-lĭth-ŏg′ră-fĭ* [Gr. *lithos*, a stone]: a method of producing a copy of a print or drawing in line—of the same or altered dimensions—on a lithographic stone by means of photography.—*Photography*, as the art of producing images upon a surface by the action of light, has been developed in a great number of processes. Rays of light possess, in addition to their heating and lighting power, what is known as *actinic* or chemical power. This fact is seen in many cases, and is familiar in the fading of carpets and other dyed fabrics, when exposed to the sun. If over a readily faded material an opaque object is placed, and the whole is exposed to the sun, after a time an image giving the contour of the object will be produced by the fading of the unprotected parts of the fabric surrounding it, while the parts covered by the object retain their color. This would be a true photograph. Many chemical compounds are far more sensitive to light than the most fugitive dyes, and several of these are utilized in P. The above example of P. illustrates what is known as 'contact-printing.' For work in the field, it is obvious that this would not answer, as contact would be quite impracticable. Accordingly, the Camera Obscura (q.v.) is used to produce a focal image. In the exact plane of the image, a plate or film of some material sensitive to light is exposed for a short time to the rays reflected by objects, next passing through the lens, and finally coming to the conjugate foci in the locus of the focal image. This is the process of exposing the plate, often called taking the 'exposure.' The plate is unchanged, to all appearance, and shows no image; but it has been affected chemically, and those portions on which the light has acted are thrown into a state of unstable equilibrium; and on treatment with proper reducing agents, the image gradually appears. Next, by immersion in a solution which dissolves unaltered silver salts, the image alone is left on the plate, forming a negative, from which, by contact-printing, a positive is produced. At the outset, therefore, the terms 'positive' and 'negative,' constantly used in photography, are to be explained. In their ordinary meaning, one is the reverse of the other, as regards light and shade. But with respect to a photographic picture on glass, its being a positive or a negative really depends on whether it is viewed by reflected or by transmitted light. Daguerreotypes all are positives, because they are taken on metal plates, and can be seen only by reflected light. Our picture on glass also is positive when viewed in the same way; but as glass is transparent, the picture is negative when looked at by transmitted light—i.e., when held between the eye and the light. Those portions of the image which are light in the positive way are dark in the negative way. This will be quite plain to any one who looks at such a picture by both lights, laying it on black cloth for the positive view. The old 'ambrotype' was a negative on glass backed by a black coating, so that the transparent portions of the glass appeared black. The 'ferrotype,' still in use, is a negative on black-varnished iron. The black varnish shows through the transparent portions of the film, giving the desired effect. For convenience, it has become the practice to call a photographic picture a negative if it is intended to print positive pictures from it. In a negative, the parts intended to print black on the paper are completely transparent, the whites are completely opaque, and the gradations between are the intermediate shades. Usually, the negative is on glass, and the positives are prints on paper; but negatives are sometimes produced on paper made translucent by means of wax or castor-oil, or they may be on gelatin films. Films of celluloid are now largely used for negatives, the celluloid being supplied as a roll, enough for a large number of pictures. The entire roll is attached to the camera, and can be entirely used before removal, if desired. A photographer generally manipulates his picture differently, according as he intends it for a negative or a positive, so that a photograph on glass can scarcely be at the same time a pleasing positive and a good negative; but this is a mere technical detail.

History.—It is usual to regard the observation by the alchemists of the 16th c. that *Luna Cornea*, or Horn Silver, argentic or silver chloride, is blackened on exposure to light, as the first important step in the history of photography. This property of chloride of silver, also the darkening of nitrate of silver by light in the presence of organic matter, constitute the leading facts on which the science of photography is based. In 1777 the famous Swedish chemist Scheele found by experiment that silver chloride was blackened quickest by the violet rays of the solar spectrum, thus proving that the rays of light are not all alike chemically active. A quarter of a century later, Ritter of Jena demonstrated the existence of chemically active non-visible rays beyond the violet rays of the spectrum.

The honor of having been the first to produce pictures by action of light on a sensitized surface is now generally conceded to Thomas Wedgwood, an account of whose researches was published 1802 in the *Journal of the Royal Institution*, under the title: 'An Account of a Method of copying Paintings upon Glass, and of making

Profiles by the agency of Light upon Nitrate of Silver; with Observations by H. Davy.' The misfortune was that no attempts made either by Wedgwood or Davy to prevent the uncolored portions from being acted on by light (or, as we now say, to *fix* the picture) were successful.

M. Niepce of Chalon-on-the-Saone, France, was the first to enjoy the satisfaction of producing *permanent* pictures by the influence of solar radiations. This was accomplished 1814, and the name chosen to designate his process was Heliography. It consisted in coating a piece of plated silver or glass with asphaltum (bitumen). The plate so prepared was then exposed in the camera obscura for a length of time, varying from four to six hours. Wherever the light acted, it rendered the asphaltum insoluble in certain essential oils. Hence, on subsequent treatment with one of these solvents, the shadows of the image dissolved away, and the lights were represented by the insoluble asphaltum remaining on the plate.

Daguerre appears to have begun 1824 the experiments which eventually led to the discovery of the daguerreotype process. On Daguerre's learning that Niepce was working in the same direction as himself, the two formed a partnership 1829. The discovery of the daguerreotype was announced 1839, Jan., but the details of the process were not made public till Aug. following. It consists in exposing a metal plate covered with iodide of silver for 20 minutes in a photographic camera, the plate being afterward transferred to a dark room, and exposed to the vapor of mercury, which develops the latent image, hitherto quite invisible, and which is afterward fixed (see DAGUERREOTYPE). Although this process has become almost obsolete, it was really the first which was of any practical value. While Daguerre's processes for the purpose were imperfect, he succeeded in fixing his pictures; though it was Sir John Herschel who announced the great suitability of the hyposulphites for dissolving the haloid salts of silver.

1839, Jan. 31, H. Fox Talbot read a paper to the Royal Soc. on 'Photogenic Drawings,' just six months previous to the publication of Daguerre's process. He produced these in this way: Writing-paper was steeped in a solution of common salt, and dried: it was then dipped in a solution of nitrate of silver, which is changed by the action of the common salt into the chloride of silver, some of the nitrate, however, remaining unaltered. Paper so treated is extremely sensitive to light, so that when a fern-leaf, e.g., is placed close down upon it between two plates of glass, the paper blackens except where it is covered; thus a reversed picture, or silhouette of the leaf in white, on a black ground, is obtained. This *negative* was then placed over another sheet of paper, prepared in the same way, and the light allowed to act through it. Another picture of the leaf was thus produced, but this time with the lights and shades unreversed; in other words, a *positive* print, or silhouette in black, on a white ground, was got. A large number of these positives were obtained from one negative. Talbot fixed the print with bromide of potassium.

The Calotype process was patented by Fox Talbot 1841: it is sometimes called the Talbotype process. He had now so far perfected a photographic process that the steps in it remain practically the same to the present day, though the materials used differ to some extent. Talbot produced his negative by preparing paper on the surface with iodide of silver, subsequently washing it over with a mixture of nitrate of silver, with gallic and acetic acids, and then exposing it in the camera to the object that he wished to copy. The invisible image or picture thus obtained was developed by aceto-nitrate of silver and gallic acid, and fixed with bromide of potassium. The paper negative was then waxed to make it transparent, or, more properly, translucent, and used for production of many positives in the way described above.

Photographic Apparatus.—The most important piece of apparatus used by the photographer is the Camera Obscura (q.v.), generally called simply a camera. On the front portion, a suitable glass lens is fixed, which throws the image on a ground-glass screen placed at the back, to enable it to be sharply focused. A thin, flat box with a sliding shutter, together called a 'plateholder,' contains the sensitized plate. Generally, plateholders are arranged to contain two plates: such are provided with two sliding shutters, one on each face. When the picture is focused, the screen is withdrawn, and the plateholder inserted in its place; the shutter is then drawn out, and the sensitized plate, which exactly occupies the place of the glass screen, being now exposed, receives the picture. In a brief time, which now varies from a fraction of one second to several seconds in a good light, the shutter is closed, and the plateholder returned to a dark room, where the plate is taken out and developed.

For general purposes, it is desirable that the camera should be as portable as possible, consistent with strength; consequently it is made usually in the bellows form, so that it will fold into small space. The tripod stand which supports the camera also requires to be light and strong; and the legs may be very light, yet not shake with the wind, as no view involving time exposure (i.e., not instantaneous) can be taken except when the camera is perfectly steady. If a dark tent is not used, it is necessary, when working in the field, to take as many dry, sensitive plates, put up into double plateholders, as one intends to use in one day, unless a 'changing box,' or one of the rolling films above alluded to, be adopted. The tent is now generally discarded.

Lenses.—The quality, as well as the kind, of lens used is of great importance. For the different forms and properties of LENSES, see LENS: a few words follow here about the kinds used in photography. A lens which is well adapted for taking portraits or other objects in a room is not suitable for taking landscapes. In the first case, it is necessary for the lens to give only a sharp definition of a figure a few feet off, and to do its work rapidly; while what is required in the other case is that distant objects, lying in far different planes, should be clearly defined. To effect this, the curves of the lenses, as well as their distance apart in the compound arrangement, must be different in each case. For ordinary landscape-work, indeed, a single lens of the meniscus form may be used, as the distortion that it gives is not much noticed; but a properly constructed double lens is better. When architectural subjects are to be photographed, a combination of lenses which correct all distortion must be adopted; otherwise vertical lines converge, and therefore appear out of the perpendicular. What is called a 'wide-angle' doublet lens is used for taking a view of a building in a narrow street, for interiors, and for similar cases, in which the operator cannot retire far enough to take in the whole object with an ordinary lens. A doublet lens of the ordinary kind for landscape-work embraces an angle of about 50°, while a wide-angle doublet embraces 90°, or even 100°; that is, these lenses cover circles whose respective diameters subtend angles of 50° and 90°—100° from their optical centres.

A diaphragm or stop is used with the lens. This is a thin piece of metal perforated with a hole. Different sizes of stops are used, the largest aperture of which is much less in diameter than the lens itself. The aperture is placed opposite the centre of the lens. Since the central rays and the marginal rays have different points of intersection, the object would be wanting in definition if all the rays were used.

Wet Collodion Process.—Collodion (q.v.) is the name given to a solution of gun-cotton in a mixture of ether and alcohol. When this is spread over a glass plate, it gradually dries into a transparent film. It was introduced for photographic purposes first 1851 by Scott Archer, and has been of great service. For fully a quarter of a century, the wet collodion process was almost exclusively practiced by photographers. Dry collodion processes also have been in use, though on a much more limited scale. All these are now mostly superseded by a method in which gelatin takes the place of collodion. These are the stages in the wet collodion process: (1) A glass plate made perfectly clean is coated with collodion, to which salts, such as the bromide of cadmium, and either iodide of potassium or iodide of ammonium, have been added. (2) The collodionized plate is 'sensitized' by immersion in a bath of nitrate of silver containing 35 grains to every ounce of distilled water. (3) Production of latent image by exposing the sensitized plate in the camera obscura after the object has been focused. (4) Development of latent into visible image by flooding the plate with a solution of some reducing agent, such as sulphate of iron (ferrous sulphate), or of pyrogallic acid, to which are added a little bicarbonate of soda, potassium bromide, some alcohol or acetic acid, as required. (5) Fixing of the permanent image by immersion of the plate in some solvent of the unactinized silver salts—i.e., of those parts of the sensitive surface upon which the light has not acted.

For negatives from which paper positives are to be printed, the solvent is a solution of hyposulphite of soda (sodium hyposulphite).

For positives—i.e., where the original photograph on glass is to be kept as a positive, as in the ambrotype and ferrotype processes—the solvent is cyanide of potassium.

Dry-Plate Processes.—It is sufficient merely to mention a few of the earlier dry-plate processes, since except for experimental purposes they all have been superseded by the modern gelatino-bromide process. Several advantages arise, especially for field-work, from using dry, sensitive plates. With the wet process, the operator, when away from his studio, must take with him a dark tent, collodion, a silver bath, and developing agents; but these *impedimenta* are not required with dry plates. Dry-plate processes are of two principal kinds: (1) Those in which the collodion is applied to the glass plate, and afterward sensitized in the silver bath, as in the wet way, but with a preservative such as albumen 'flowed' over the surface, and the plate allowed to dry. (2) Emulsion processes, in which the sensitive silver salt is held in suspension in the collodion or gelatin. A good emulsion can be prepared by adding some soluble bromide, such as bromide of cadmium, to the collodion, and afterward an alcoholic solution of nitrate of silver. The glass plates are simply coated with this emulsion, and set aside to dry, when they are ready for use. The gelatin emulsion is now almost universally used for dry plates, and the latter are made by several makers in immense quantities.

The earliest form of the gelatino-bromide process, at present employed, appears due to Dr. Maddox, who published the details of a workable emulsion of this nature 1871. The process was improved 1873 by Kennett, and again 1878 by Charles Bennett. It was found that if the emulsion was kept at a temperature of 90° F. for some days, or boiled for half an hour, the sensitiveness of the plate coated by it was so greatly increased that a view which could not formerly be taken in less than 30 seconds could now be taken in one. A very sensitive gelatin emulsion can be formed also by using ammonia with the bromide of silver. Dry plates produced by some form of the gelatino-bromide process are now manufactured on a large scale. When properly made, they will keep for an indefinite time, and they can be developed months after having been exposed. Dry plates can now be made so very sensitive that in a good light a negative can be taken in an undetermined fraction of a second. To obtain a well-defined photograph of an express train in motion, of a swallow poising, or of moving waves or clouds, is no longer difficult. Cannon-balls in motion, as projected from the gun, have been photographed. In taking these photographs, what is called an 'instantaneous shutter' is generally employed for the lens of the camera—i.e., a cover which by some means, such as a spring, will admit light for only a fraction of a second. For the instantaneous shutter, Marcy & Anschutz have substituted a disk or a curtain with a radial aperture or a long slit, moved rapidly across the face of the sensitized plate in the camera.

Photographic Printing: Silver Prints.—As above stated, the production of a silver print on paper depends on the action of light on chloride of silver. The process until recently was conducted in essentially the same way as it was originally by Fox Talbot. The paper is now manufactured already sensitized, and with gelatine sizing in place of the albumen. The paper is exposed to light under a negative and pressed close to it in a printing frame. In a short time a print is obtained, which is fixed by hyposulphate of soda. The details of the process are briefly as follow:

(1) Suitable paper is coated on the surface with a smooth, thin layer of albumen, to which chloride of sodium or of ammonium has been added. (Occasionally, the paper is salted only—i.e., impregnated with chloride of sodium or common salt.)

(2) Silvering of the paper by floating it, albumen side downward, on a solution of nitrate of silver, 60 grains of this substance being used for every ounce of water: it is afterward dried.

(3) Exposure to light. The silvered paper is exposed behind the negative in a printing-frame with a glass front: the time of exposure varies from ten minutes to two or three hours, but occasionally much longer, according to the brightness of the light and the character of the negative. A visible image formed by reduction of the silver salts is produced. The frame is arranged to allow of inspection of the picture from time to time.

(4) Toning. To give a pleasing color to the print, or to insure its permanency, it is usual to tone it in a solution of trichloride of gold.

(5) Fixing. The print, when taken from the toning bath, is steeped in a solution of hyposulphite of soda, which removes the undarkened silver salt, and thus fixes the image.

(6) Washing. Silver prints require to be washed thoroughly after treatment with the hyposulphite of soda. Imperfectly washed prints soon spot and fade.

Orthochromatic Photography.—Different colors possess different actinism as regards the light which they reflect. Hence, in a photograph, many colors take dark which to the eye appear light. Among these is yellow, which, being non-actinic, does not affect the plate, but produces a transparent image on the negative, giving a black on the positive. In general terms, a photograph is taken principally by the violet rays of the spectrum. To overcome this is the object of orthochromatic P. A screen of yellow glass is inserted between the two lenses of the objective, or the film itself is dyed with an aniline color: the effect is to cut off the violet rays and cause the photograph to be taken by the less actinic rays of the less refracted end of the spectrum. Very elegant effects are thus produced, especially where autumn foliage or highly colored subjects are to be taken.

Photography in Natural Colors.—This is still an unattained dream except by an indirect method. Almost as soon as it was found possible to make photographs in monotone, scientists began to look for some method of reproducing nature in color. About 1839 Fox Talbot found that the colors of glass transparencies were reproduced to some extent in contact printing with silver chloride. Sir John Herschel, at about the same time, worked on an almost identical investigation. Herschel also experimented with the juices of flowers, but found that life was essential to their chromatic action. Poitevin, De St. Florien, Besquerel, and Niepce de St. Victor also experimented in this line, but met with no marked success. The only methods which have as yet afforded successful results are based on the trichromatic process of color analysis. This was first suggested by Prof. James Clerk Maxwell in a lecture before the Royal Institution in 1861. The process consists essentially in (1) the production of three photographic images which represent the physiological analysis of all colors into three simple spectrum colors and which constitute a color record, and (2) synthesis by optical superposition of the three elements of the color record in the three simple colors, whereby the sensations of all the original colors are reproduced to the eye. The next published suggestion after Maxwell's was made by Henry Collen in 1865, in a letter to the *British Journal of Photography.* This was followed in 1868 by an application for a patent on the trichromatic principle by Louis Ducos du Hauron. About the same date a system of trichromatic photography was proposed by Charles Cros of Paris. In 1888 Frederic E. Ives (q.v.), of Philadelphia, perfected a method of color analysis and synthesis based on Maxwell's suggestion. By this method three photographic images are obtained through red, green and blue screens, from which three transparencies are made. When these are placed in his optical instrument, called "photochromoscope," one image is produced which gives all the colors of the original object. The photo-chromoscope is so arranged that the transparencies are viewed under the same colors respectively as those under which they were photographed, and are superposed by reflectors, so that they form one image. Somewhat less perfect results are afforded in prints on glass or paper by various printing processes. Such color prints, made in the type press from three half-tone process blocks, a method also invented by Mr. Ives, are coming into extensive use for book and periodical illustration. In 1891 Prof. Lippmann, of Paris, announced a method of direct color photography which consisted in employing a very translucent film of silver bromide in albumen or gelatine, backed up by metallic mercury. The incident rays, passing through the sensitive film, were reflected back upon themselves by the mercury surface and formed interference lamina within the film. These lamina were then fixed by the photographic process. The colors produced were similar to Newton's ring colors, and a few remarkable examples have been produced. At present, however, the process is only of scientific interest.

Bromide Printing.—This method has become quite popular lately, especially with amateur photographers. The paper is sensitized with a slow bromide of silver emulsion, coated on it in practically the same manner as a dry plate. It is printed for a short time by artificial light behind the negative, then developed, and fixed the same as a dry plate.

Platinotype or Platinum Printing Process.—This kind of printing is much used, as the prints are believed to be permanent, and they are liked by some for their appearance, which differs considerably from that of silver prints. Capt. Abney, F.R.S., thus describes the method which gives the best results: 'Mr. W. Willis, Jr., found that he could obtain an image in platinum black, by means of development, if he sensitized his paper with ferric oxalate, with which was mixed a solution of chloro-platinite of potassium. The action of light on this paper is to reduce the ferric salt to the ferrous state; and when the ferrous salt is in solution, the platinous salt is reduced by it. By floating the exposed paper on a solution of neutral potassium oxalate, which is a solvent of the ferrous oxalate, the platinum salt in contact with it is immediately reduced to the metallic state, and an image is thus built up. To fix the prints, they are immersed in dilute hydrochloric acid, which dissolves away any ferric oxalate there may be, and also gets rid of any oxalate of lime.'

The Carbon Printing Processes.—So far back as 1839, Mungo Ponton announced that paper steeped in bichromate of potash, and dried, changed its color when exposed to light. It was subsequently discovered that light not only alters the composition of the bichromate, but also oxidizes the size (gelatin) of the paper. Gum, starch, and albumen also were found to become, like gelatin, insoluble when exposed in contact with the bichromate of potash to the action of light. Swan, Woodbury, the Autotype Co., and others have utilized this property of gelatin in their processes. In order to see clearly the effect of light on bichromatized gelatin, Capt. Abney suggests that these three simple experiments be tried: Prepare pieces of paper by brushing them over with a viscous solution of gelatin, in which is dissolved six per cent. of bichromate of potash, and expose them beneath negatives of line-engravings. On immersing one of them in cold water, it will be noticed that the parts protected from the light immediately begin to swell through the absorption of water, while those portions unprotected remain unchanged. On immersing another sheet in hot water, the protected gelatin will dissolve away entirely, while the rest will remain firmly attached to the surface of the paper. Let a third sheet of the exposed gelatinized paper be brushed over with thin, greasy, lithographic ink, and, after soaking in cold water, a wet sponge may be applied to remove all the ink that will come away. It will be found that the non-absorbent parts retain the ink, while the others reject it.

Swan's Carbon Process.—This is understood to be the first of the permanent printing processes with pigmented gelatin which was commercially successful. In its main features, it resembles what is now called the autotype process. By Swan's method, the paper is coated with a layer or thick film of gelatin which has been previously colored all through its thickness with some permanent pigment such as lamp-black. This color is made of carbon in the state of fine soot—hence the name given to the process. The paper so coated is sensitized with ammonium bichromate, and then exposed under a negative till it is supposed to be sufficiently printed. In this case the image is not seen as in a silver print; in a certain sense it is latent; therefore some indirect plan of telling the proper time of exposure, such as by the use of an actinometer, must be resorted to. The change which takes place in the gelatin film is this: The surface of it next the negative has been rendered insoluble wherever the light has acted, and that to a depth corresponding to the intensity of the light. It results from this that almost the whole surface of the gelatin has been rendered insoluble, but to the greatest depth where the light has acted most strongly. Insoluble portions, however, remain inclosed between its surface and the paper. No picture is visible till these are removed. In this process, the external surface of the exposed gelatin is cemented to a second sheet of paper by a solution of India-rubber. Therefore the gelatin layer, with its undeveloped image, is now placed between two sheets of paper; but when it is immersed in hot water, the original backing of paper is easily stripped off, after which the soluble gelatin dissolves away, leaving a picture in pigmented and insoluble gelatin. The image is, however, reversed, so that an object such as a tree seen on the right in the negative now appears on the left in the print; this is obviated by the use of a reversed negative, or by making a double transfer.

A formula for 'pigmented tissue,' as the prepared paper used for prints of this type is called, can be made with a gelatin solution thus composed: *Autotype formula:* flake gelatin, 1,500 grains; brown sugar, 150 grains; honey soap, 150 grains; glycerine, $\frac{3}{4}$ oz.; water, 14 oz.: lamp-black or some other pigment is added, with a little warm gelatin and glycerine. The solution is made hot in a porcelain dish, and the paper floated over it. In Swan's process, the undeveloped gelatin print adheres to the paper support to which it is transferred, by a solution of India-rubber: in an improved process, called the autotype, it is transferred to a paper made impervious to water by a coating of insoluble gelatin. An application of pressure with a flat bar of wood covered with India-rubber, called a squilgee, causes the exposed print to adhere to the impervious paper; and the soluble gelatin is removed by hot water after the original paper backing has been stripped off as described above. This is called the single transfer process. The double transfer process differs merely in the adoption of a second temporary support of opal glass, zinc, or paper, coated with a suitable preparation, to get a print which is not reversed.

Woodburytype and Stannotype Processes.—Many years ago, it was found that if a leaf, a bit of lace, or any similar object was placed on a sheet of soft metal, and considerable pressure applied, the impression of leaf or lace was sunk into the metal. From this metal plate, prints were taken as from an engraved plate, and the process was called Nature-Printing (q.v.). If we laid an ordinary autotype print, instead of a leaf, on a flat piece of iron, covering it at the same time with a smooth piece of sheet-lead, and then put them under sufficient pressure, the result would be an imperfect Woodburytype mold in the soft lead. The metal reverse would be faulty, because in this case the gelatin film is too thin to give enough of relief. To obtain a proper mold, a layer of sensitized gelatin, considerably thicker than that used for an autotype print, is exposed under a negative. It is developed as in the autotype process, and presents the image in considerable relief. The print is then covered with the lead, and they are pressed together in a hydraulic press, which produces a reverse or mold of the picture in the soft metal, without injuring the gelatin relief.

The production of ordinary Woodburytype prints is a purely mechanical operation, the chemical action of light not being called into play. The mold is placed in a printing-press of peculiar but simple construction, and a viscous solution of pigmented gelatin forms, so to speak, the printing-ink. This is poured on the mold, and a thin, hard, strongly sized paper placed on top of it. The lid of the press has beneath it a perfectly flat glass plate, which is now brought down on the mold, and the lid firmly locked by a catch. The pressure causes all the superfluous gelatin to exude, while that in the mold adheres to the paper. In a short time the gelatin sets, when the plate is raised, and the print withdrawn. It has now only to be placed in a solution of alum, which renders the gelatin forming the picture insoluble.

The Stannotype (or printing from a surface of tin) has been called a simplified Woodburytype process, and is becoming much used. Woodbury, to whom it also is due, thus describes it: 'A positive is first made from the negative—preferably by the carbon process. From this carbon or other transparency a negative is made also in carbon; but in this case the tissue possesses much more body and much less color, so as to obtain a certain amount of relief. This (gelatin) relief negative is then coated with a thin India-rubber varnish. A piece of tinfoil is laid over it, and the whole passed through a pair of India-rubber rollers—a species of mangle, in fact. We have now a printing mold ready for placing in the press and printing from in gelatinous ink.'

Heliotype and Phototype Processes.—Both of these are photo-mechanical methods, in which the gelatin picture is itself used to print from in some form of printing-press, instead of being covered with tinfoil, as in the stannotype process. Lithographic ink is used. The film or layer of gelatin forming the printing surface requires to be specially and carefully prepared.

Photographic Enamels on Glass and Porcelain: Powder Process.—By what is called the powder process, prints are produced on paper in plumbago. It has been much used on the continent of Europe. A slightly sticky or 'tacky' preparation of sugar, gum, glycerine, and potassium bichromate, when exposed to light, loses its tackiness in proportion to the intensity of the light acting on it. A glass plate coated with this preparation, therefore, when exposed under a negative, will represent the picture, so to speak, by different degrees of tackiness. In this state, a fine powder sprinkled over it will adhere in proportion to the stickiness of the surface. When the superfluous powder is removed, and the film coated with tough collodion, it can be detached, and, if required, put on any support, such as paper; but the soluble portion of the gum, etc., is previously removed by washing.

If some powdered metallic oxide, instead of plumbago, is dusted over the undeveloped picture, supposing it to be either on glass or on china, and heated in a suitable kiln, it will become vitrified in the same way as does an enamel color when painted on.

Cyanotype or Blue-Print Printing: Copying of Plans.—This is a simple and useful way of copying geometrical drawings. The drawing is made on tracing-cloth or tracing-paper in strong, or at least distinct, black lines, and this forms the negative. A sensitizing bath can be made of 1 ounce of citrate of iron and ammonia, 1 ounce of red prussiate of potash (potassium ferricyanide), and 8 ounces of water. An even coating of this is applied to a sheet of paper. When dry, the tracing is placed on the top of the paper, and both are covered with a glass plate to keep them in perfect contact. Ten minutes in a very bright light will suffice for exposure. The print is then washed, when the lines of the drawing will appear white on a blue ground.

Durability of Photographic Prints.—Experience has proved that silver prints, however carefully prepared, cannot be depended on for permanency. Much vexation has frequently arisen from the fading of these; on this account they are no longer used for book-illustration. They will keep better unmounted than mounted, and they should be kept in a dry situation, as damp increases their tendency to fade. Platinotype prints are believed to be permanent by those best able to judge; yet this is not altogether certain. Autotype, Woodburytype, and other prints in pigment gelatin are presumably permanent, and of course those obtained by any of the photomechanical processes are certainly so when printed, as they usually are, in lithographic or printers' ink.

Photolithography and Zincography.—The only difference between these is that a lithographic stone is used in the first case and a plate of zinc in the other for the mechanical printing. By what is called the transfer process, this art is now largely practiced. It is necessary that the original drawings should be done in lines, and not in half-tint. A negative is taken from the drawing by the camera, and from it a print is made on paper coated with bichromatized gelatin much in the same way as in the autotype process. But before the print is developed, it receives a coating of lithographic transfer ink prepared specially for the purpose. It is next floated in warm water till the lines are seen as depressions. With the aid of a sponge and water at temperature about 150° F., the soluble portion is removed, leaving the picture in insoluble gelatin, with its coating of transfer ink. It then requires only to be washed, dried, and transferred to the stone or zinc plate (see LITHOGRAPHY).

Photo-Reliefs.—This term is applied to a picture in relief on metal, which can be used like a wood-cut in the ordinary printing-press. The image from an inked 'transfer' of the same kind as that used in photolithography is transferred to zinc so as to form a resistant to an etching fluid. Finely powdered rosin is added to the layer of ink, to make a still better protecting surface. Weak acid is then applied, which so far etches the picture. Dilute sulphate of copper is next flooded over the zinc, which produces a fine deposit of metallic copper on the bare parts of the zinc. The plate is again immersed in the acid, and voltaic action now takes place, causing the zinc to dissolve where not covered by the ink. When the action ceases, the plate is washed with water. More ink and rosin, as well as new copper solution, is applied, and the plate again put into the acid. This operation is repeated till a sufficient depth is given to the relief. Electrotypes, which are sometimes faced with steel, are made from these zinc reliefs. This process is said to give very good results. There are a number of ways of making these relief blocks, several of which are by the use of a fatty transfer in some similar way to that above described, but without the voltaic action.

Photo-Engraving.—For reproduction of line drawings, zinc plates are mainly used. A negative giving good contrast having been made, the zinc is polished and coated with a solution of albumen, water and bichromate of ammonia, and dried slowly by heat. After printing behind the negative, the plate is covered with greasy lithographic ink, which adheres to the insoluble, or exposed, parts after washing. It is then powdered with dragon's-blood, which sticks to the remaining ink and prevents the metal from being affected in those parts when etched in dilute nitric acid. Another important branch of this art is the half-tone process, in which a negative is obtained which gives an image on the metal plate consisting of a great number of small black dots and clear spaces. The sizes of the dots and spaces vary with the tones of the original. This effect is obtained by using in front of the negative plate a glass screen having lines ruled upon it to cause alternating black lines and clear spaces. The lines are usually ruled in two directions, crossing at right angles, and having a clear space at the intersections. The metal plate, usually copper, is coated with a sensitive enamel composed of albumen, glue, bichromate of ammonia and water, which becomes insoluble in water when exposed to light. When the print has been made on the copper plate from the half-tone negative, the unexposed portions of the enamel are washed out, leaving the enamel in dots where it has been exposed. It is then heated to render the enamel insoluble in the etching fluid, and is etched in chloride of iron. The printed picture from these plates consists of a series of dots, grading from very small in the lighter portions to almost or quite solid blacks in the deepest shadows. This method is now used for book and magazine illustrations.

Photography is now much employed to transfer drawings and pictures from nature on to the wood for the wood-engraver. This process is of much importance, as the original drawing is preserved, not only for comparison with the finished engraving, but also for its artistic value. Moreover, the drawing may be made of any convenient size, and reduced on the wood—a great consideration when minute objects are to be represented. One process is as follows: The surface of the wood is prepared with a ground of water-color Chinese white, and, to harden it enough to resist the subsequent washings, the enamel of a glazed card is added. It is then coated three times: (1) with a solution of albumen, and dried; (2) with a solution of albumen and chloride of ammonium, and again dried; (3) with a mixture of 1 ounce ether, 1 ounce alcohol, 8 grains gun-cotton, and 30 grains nitrate of silver. On this surface the subject is printed from the negative, after which the collodion is dissolved off by alcohol and ether. The image is fixed with hyposulphite of soda, and when washed and dried is ready for the engraver, who now engraves the block in the usual way.

Photomicrography consists in enlargement of microscopic objects, by means of the microscope, and projection of the enlarged image on a sensitized plate. The principle on which the enlargement is effected is that of the conjugate foci, exactly the same as in ordinary photography. This branch of microscopic and photographic science has proved a useful aid in the sciences of Botany, Physiology, and Entomology.

Microphotography.—By reversing the arrangement necessary for enlargement of microscopic objects, minute photographs of engravings, or other objects, may be produced, which would require a microscope for their inspection. In this way, communication was maintained during the investment of Paris, when minute photographic copies of letters and newspapers were inserted in quills, and fastened to carrier pigeons.

Celestial Photography comprehends the application of photography to automatic registration of astronomical phenomena. The laborers in this field of scientific research have been numerous in the United States and Europe. It is not going too far to say that photographic astronomy largely displaces direct observation and may fairly be termed the astronomy of the future. An interesting item in these researches is the demonstration of the sphericity of the moon by means of the stereoscope and lunar photographs; also the determination of the nature of many of the more obscure markings on its surface, by which elevations are clearly distinguished from depressions. Also the faculæ and spots on the sun's surface have been photographed, and examined stereoscopically, by which they have been found to arise from elevations of the outer regions of the photosphere. The instrument for the purpose of solar photography is called a photoheliograph. Photography has been extensively employed also in connection with solar and stellar spectroscopy; and in the hands of Lockyer in England, Draper in America, and Vogel in Germany, has rendered much service to astronomical science.

There are many applications of photography in other branches of science not here mentioned. In meteorology and in military engineering, it has been of especial use. For police purposes, it has proved of great service: every convict is now photographed, and his portrait can be widely distributed if necessity arises. See Positive Printing.

PHOTOGRAVURE, *fō-tō-grâv′ūr* [Gr. *phōs*, light; F. *gravure*, engraving]: art of producing an incised engraved plate for printing, by the action of light on a sensitized surface, often supplemented by the action of an acid. The Niepce process of P. is well adapted for the reproduction of line-engravings. In this process a copper-plate is coated with bitumen and exposed to the action of light, with a negative superposed on it. The print thus produced is brought out with olive-oil and turpentine, by which the parts acted on by the light are dissolved, while the rest of the surface is but slightly effected. Then the plate is etched. In the process invented by Fox Talbot, a gelatin print is transferred to a copper-plate to which a grain has been given by sprinkling its surface with powdered resin, which is then warmed. In etching with ferric acid, the opaque portions of the gelatin film are rendered insoluble and impermeable. Immersion of the plate in a weak solution of copper sulphate, before etching, increases the regularity of the erosion by the ferric acid. For the Woodbury process, see PHOTOGRAPHY.

PHOTOLOGY, n. *fō-tŏl′ŏ-jĭ* [Gr. *phōs* or *phōta*, light; *logos*, discourse]: the science of light, explaining its nature and phenomena; optics. PHOTOLOGIC, a. *fō′tō-lŏj′ĭk*, or PHO′TOLOG′ICAL, a. *-ĭ-kăl*, pertaining to.

PHOTO-MAGNETISM, n. *fō′tō-măg′nĕt-ĭzm* [Gr. *phōs* or *phōta*, light; and Eng. *magnetism*]: that branch of science which describes the relations of the phenomena of magnetism to those of light.

PHOTOMETER, n. *fō-tŏm′ĕ-tėr* [Gr. *phōs* or *phōta*, light; *metron*, a measure]: instrument for measuring the relative intensities of light. PHOTOM′ETRY, n. *-trĭ*, art of measuring the intensity of light; measurement of the intensity of the different kinds of light.—The *Photometer*, as an instrument for scientifically measuring intensity of light, seems to have been sought first by Bouguer; but his investigations were far surpassed by those of Lambert, about 1760, who indicated an exceedingly simple and effective kind of P., afterward constructed by Rumford. The instrument consists of a screen of thin paper placed vertically, and behind it, at the distance of a few inches, is placed a cylindrical stick, or any other similar body. When the intensity of light from two flames is to be compared, they are placed behind this stick in such a way that each casts a separate shadow of the stick on the paper screen. The observer stands in front of the screen, and directs the removal of the two lights either to or from the stick, till the shadows which are cast on the screen are equally obscure. The distance of each light from the shadow that it casts on the screen is then measured; and the squares of these distances give the relative intensities of the two lights. This P. may be modified by employing, instead of a cylindrical stick, a second screen parallel to the first, but of greater thickness, and having an aperture cut in its centre. The two lights being then placed behind the second screen, and considerably apart, each casts a separate illumination through the aperture in the second upon the first screen, and the observer in front of the latter changes their relative distances till the illuminations appear to the eye of equal intensity. The calculation is the same as before. There are several other classes of photometers, which, however, do not deserve the name, as they depend on the heating and chemical powers which generally accompany light, and not upon the intensity of its action on the organs of vision. Thus, Leslie's instrument is nothing more than a differential thermometer, while Saussure's and Landriani's depend on the chemical effects of light. The chemical P. of Bunsen and Roscoe depends on the quantity of hydrochloric acid formed in a specified time from the union of its gaseous elements under the influence of light. The Bunsen P., of which a modified form is commonly used in gas-works, is independent of chemistry, and consists mainly of a screen of thin writing-paper on a frame, with a spot of grease on it. When there are lights on either side of the screen, the spot will show dark on the side toward the weaker light. When the lights are equal, the spot is of the same shade as the surrounding paper, and the intensity of the light is calculated from their varying distance from the screen, the square of the distance showing the power of the lights. In the well-known P. of Bouguer, as modified by Ritchie, the lights from the two sources in comparison are reflected so as to show side by side. The more powerful is moved away till the two reflections seem equal; then the calculation from distance is made as before. Very excellent work in celestial photometry has been done in later years; in observations at Harvard Observatory, many very delicate photometers, some of them new in principle, have been successfully employed. (See *Nature*, 1879.)

PHOTOPHOBIA, n. *fō′tō-fō′bĭ-ă* [Gr. *phōs* or *phōta*, light; *phobĕō*, I dread; *phobos*, fear]: the dread, fear, or intolerance of light.

PHOTOPHONE, *fō′tō-fōn*, or RADIOPHONE: name of a comparatively simple apparatus which may be said to achieve the feat of transmitting articulate speech to a distance along a beam of light. It was described first in 1880 by Prof. Graham Bell, known in connection with the telephone, at the Boston meeting of the Amer. Assoc. for the Advancement of Science; though in 1878 its inventor had announced the possibility of 'hearing a shadow' by means of a similar agency. The success of the P. depends on the peculiarities of the metal selenium. Crystalline selenium offers a high degree of resistance to the passage of an electric current; it is eminently sensitive to light; and the resistance is less when exposed to light than in the dark, being in some cases only a fifteenth in the light of what it is in the dark. Founding on these peculiarities, Prof. Graham Bell, his friends and assistants, devised about 50 forms of apparatus for so varying the transmission of light to prepared selenium as to produce audible sound. In the P. found most serviceable, the transmitter is a plane mirror of silvered microscope glass or thin mica; the receiver, fixed at a distance without any connection, is a parabolic reflecting mirror, in the focus of which is placed a sensitive selenium 'cell,' connected in local circuit with a battery and telephone. When the apparatus is used, a strong beam of light is concentrated by a lens in the plane mirror; the speaker directs his voice against the back of this mirror, which is thrown into vibrations corresponding with those of the voice. The reflected beam of light, to which similar vibrations are communicated, is directed through a lens to the receiving mirror, and creates in the selenium cell a rapidly intermittent current, which at the end of the telephone attached becomes audible again as vocal sound. When first described, the P. had been used effectively with a distance of 230 yards (more than a furlong) between transmitter and receiver. The rays of the oxyhydrogen light, or of an ordinary kerosene lamp, suffice for transmitting articulate speech. The loudest sounds obtained from the P. were produced by means of a perforated disk, noiselessly revolving so as rapidly to interrupt the light in transmission

It was also found that a very audible sound could be procured from the selenium without the aid of telephone and battery. A beam of intermittent light will produce a strong musical note from the selenium. Further experiment showed that selenium is not the only substance thus sensitive to light. Still louder sounds than these obtained from the selenium directly, though not articulate, were got from diaphragms of hard India-rubber and of antimony; and sounds of varying intensity were given out by many other substances, including gold, silver, zinc, lead, paper, parchment, and wood.

PHOTO-PROCESS, *fō'tō-prŏs'ĕs* [Gr. *phōs*, light; Eng. *process*]: any process for making plates for printing by the agency of Photography (q.v.).

PHOTOPSY, n. *fō-tŏp'sĭ*, or PHOTOP'SIA, n. *-sĭ-ă* [Gr. *phōs* or *phōta*, light; *opsis*, sight—from *opsomai*, I shall see]: a disease of the eyes in which luminous rays of light appear to play before them—a symptom of amaurosis.

PHOTO-RELIEF, n. *fō'tō-rē-lēf* [prefix *photo-;* Eng. *relief*]: photograph in which the lights and shades are represented by elevations and depressions of its surface.

PHOTO-SCULPTURE, *fō-tō-skŭlp'tūr:* ingenious application of photography to assist a sculptor in modelling portrait-statues, or fac-similes and reduced reproductions of other statues; invented 1867. The subject, in the centre of a circular chamber, is photographed simultaneously by 24 cameras, arranged at equal distances round the chamber. The twenty-four photographs are subsequently made available in the sculptor's studio, where the clay model is arranged on a frame capable of being turned round. A magic lantern throws the outline of each photograph in succession on a screen in front of the artist, who by means of a pantograph brings each outline to bear on the clay. At each time, the model is turned round $\frac{1}{24}$ of a revolution. The apparatus is little used.

PHOTOSPHERE, n. *fō′tō-sfēr* [Gr. *phōs* or *phōta*, light; *sphaira*, a sphere]: a sphere of light; the luminous spherical envelope of the sun.

PHOTOTYPE, n. *fō′tō-tīp* [Gr. *phōs* or *phōta*, light; *tupos*, an impression, a type—from *tuptō*, I strike]: a type or plate resembling an engraved plate, produced from a photographic picture by a peculiar process, and capable of being printed from; the process by which such a plate is produced.

PHOTOZINCOGRAPHY, n. *fō′tō-zĭn-kŏg′ră-fĭ* [Gr. *phōs* or *phōta*, light; Eng. *zinc;* Gr. *graphō*, I write]: a process of preparing zinc plates for printing; a process similar to *photolithography.*

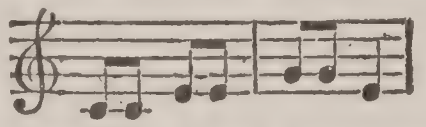
PHRAGMA, n. *frăg′mă*, Phrag′mata, n. plu. *-mă-tă* [Gr. *phragma*, a hedge or fence]: a transverse division or false partition in fruits; a spurious dissepiment.

PHRAGMITES, n. plu. *frăg′mīts* [Gr. *phragma*, a fence or hedge]: a genus of reeds growing on river-banks and in wet places: see Reed.

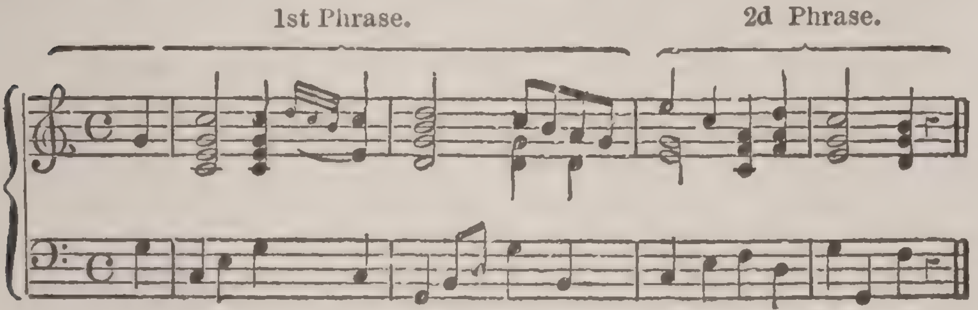
PHRAGMOCONE, n. *frăg′mō-kōn*, or Phragmacone, n. *frăg′mă-kōn* [Gr. *phragma*, a fence; *kōnos*, a cone]: the chambered cone of the shell of the belemnite cephalopods.

PHRASE, n. *frāz* [L. and Gr. *phrasis*, speech, language—from *phrazō*, I say: It. *frase:* F. *phrase*]: a short sentence or expression; two or more words containing a particular mode of speech; an idiom; style or manner in writing or speaking: in *mus.*, any regular, symmetrical course of notes which begin and complete the intended expression (see below): V. to express in peculiar words; to style. Phras′al, a. *-al*, pertaining to or of the nature of a phrase; consisting of a phrase. Phra′sing, imp.: Adj. employing peculiar expressions. Phrased, pp. *frāzd.* Phrase-book, a book containing or explaining phrases. Phraseogram, n. *frā′zē-ō-grăm*, combination of shorthand characters to represent a phrase or sentence. Phraseograph, n. *frā′zē-ō-grăf* [Gr. *graphō*, I write]: the words that compose a phrase. Phra′seog′raphy, n. *-ŏg′ră-fĭ*, the method of writing two or more words without lifting the pen. Phra′seol′ogy, n. *-ŏl′ŏ-jĭ* [Gr. *logos*, discourse]: the peculiarities or style in the diction of a writer; style or manner of expression. Phra′seolog′ical, a. *-lŏj′ĭ-kăl*, or Phra′seolog′ic, a. *-ĭk*, peculiar in expression; consisting in a peculiar form of words; idiomatic. Phra′seolog′ically, ad. *-lĭ.*—Syn. of 'phrase, n.': clause; sentence; expression; proposition; period; paragraph; form; diction; style.

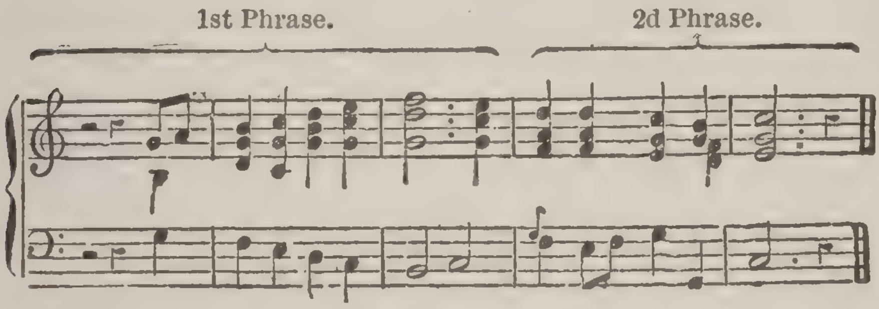
PHRASE, *frāz*, in Music: the course of simple motives containing in themselves no satisfactory musical idea, which enter into the composition of every melody containing a perfect musical idea—e.g.:



The P. consists usually of two measures; in compound time, it may be comprised in one measure, and an extended P. is one which contains three measures. In the more simple and regular forms of musical composition, two phrases unite to form a section ending in a cadence; and a perfect musical idea is formed of two such sections terminating, the first with the dominant, the second with the tonic harmony.



Dominant Section



Tonic Section.

A little confusion has arisen from the use, by some musical writers, of the word P. for what is here called a section.

PHREN-, *frĕn-* [Gr. *phrēn* or *phrĕna*, the mind—*phrēn* means the 'diaphragm or mind,' the ancients believing the *mind* to be situated in the *diaphragm*]: as the first element of a compound, *phren* has two meanings—1, 'mind,' and thence 'brain,' as in phrenetic, phrenology; 2, 'diaphragm,' as in phrenic.

PHRENETIC, a. *frĕ-nĕt'ĭk* [Gr. *phrēn*, the mind]: liable to violent sallies of mental excitement or disorder; having an affection of the brain: N. a person occasionally wild and erratic. PHRENET'ICALLY, ad. *-ĭ-kăl-lĭ*.

PHRENIC, a. *frĕn'ĭk* [Gr. *phrēn*, the diaphragm, the mind]: pertaining to the diaphragm. PHRENITIS, n. *frĕ-nī'tĭs*, inflammation of the brain or its membranes; delirium: see MENINGITIS.

PHRENOLOGY, n. *frĕ-nŏl′ŏ-jĭ* [Gr. *phrēn*, the mind, *phrĕnos*, of the mind; *logos*, discourse]: the science which teaches that the nature and character of the faculties of the human mind may be ascertained from the development of the different parts of the brain, as exhibited in the external form of the upper part of the skull. PHRENOLOGICAL, a. *frĕn′ō-lŏj′ĭ-kăl*, pertaining to or according to phrenology. PHREN′OLOG′ICALLY, ad. *-lĭ*. PHRENOLOGIST, n. *frĕ-nŏl′ō-jĭst*, one versed in phrenology.—*Phrenology*, as a science, is a theory of mental philosophy founded on the observation and discovery of the functions of the brain, so far as the brain is concerned in intellectual and emotional phenomena. P. takes into view likewise the influence of all other parts of the body, and of external agents affecting these, upon the brain.

The founder of this system was Dr. Franz Joseph Gall (q.v.), who d. 1828. In Britain, it was amply expounded by his pupil Dr. Spurzheim (q.v.), by George and Andrew Combe (q.v.), by Dr. Elliotson of London, and others. In America, Dr. Charles Caldwell and the Fowler brothers were its prominent advocates. Gall's method of investigating the functions of the brain is that which, applied to other organs, has led to the discovery of their functions, but which had never before been systematically applied to the brain. When a physiologist wished to ascertain the function of any part of the body, he did not rest satisfied with examining its structure, and speculating on the purposes for which that structure seemed adapted. He observed what kind of function appeared during life as the invariable accompaniment of the presence and action of that particular part; and, by repeated and careful observation, he is considered to have at last succeeded in discovering the function. The knowledge thus obtained was afterward verified and completed by examination of the structure, and observation of the effects of its injury or diseases. To the adoption of this principle in studying the functions of the brain, Gall was led first by observing at school the concomitance of a quick and retentive memory of words with a peculiar appearance of the eye, which he afterward found to be caused by a large development of a particular part of the brain. At school, at college, and in many other places, and under most different circumstances, the same concomitance of talent with development of brain came under his notice so frequently as to suggest to him the probability that there might be discovered by the same method a connection of other talents and dispositions with other portions of the brain. By diligent application of the method of inquiry which accident had thus suggested to him, and not, as some suppose, by exercise of his imagination, Dr. Gall was led to conclude, first, that the brain is an aggregate of many different parts, each serving for the manifestation of a particular mental faculty; secondly, that, *all other conditions being equal*, the size of each of these cerebral organs is a measure of the power of its function. These two propositions constitute the distinctive or fundamental principles of Phrenology. The first principle, however, is not new. The apparent impossibility of reconciling all actual mental phenomena with the notion of a single organ of the mind has, for many centuries, suggested the probability of a plurality of organs in the brain. But the phrenologists hold that Dr. Gall was the first to *demonstrate* the fact, and to make any considerable progress in determining with what parts of the brain the various intellectual and emotional faculties and susceptibilities are connected.

That man, in his present state, cannot think, will, or feel without the intervention of the brain, is generally admitted by physiologists, and appears from even the fact that, by pressure applied to it, consciousness is at once suspended. That it is not a single organ is *a priori* probable from such considerations as these: 1. It is a law in physiology that different functions are not performed by the same organ: the stomach, liver, heart, eyes, ears, have each a separate duty. Different nerves are necessary to motion and feeling, and there is no instance of confusion among them. 2. The mental powers do not all come at once, as they would were the brain one organ: they appear successively, and the brain undergoes a corresponding change. 3 Genius varies in different persons: one has a *turn*, as it is called, for one thing, and another for something different. 4. Dreaming is explained by the doctrine of distinct organs which can act or rest alone. 5. Partial insanity, or madness on one point with sanity on every other, similarly points to a plurality of cerebral organs. 6. Partial injuries of the brain, affecting the mental manifestations of the injured parts, but leaving the other faculties sound, tend to the same conclusion. 7. There could be no such state of mind as the familiar one where our feelings contend with each other, if the brain were one organ.

These are grounds for presuming that the brain is not single, but a *cluster of organs*, or at least that it is capable of acting in parts as well as in whole. For this conclusion the phrenologists consider that they have found satisfactory proofs in numerous observations, showing that particular manifestations of mind are proportioned, in intensity and frequency of recurrence, to the size or expansion of particular parts of the brain—this law being subject to modification in the case of the brain, as of the muscles and other parts of the body, by differences of health, quality, exercise, etc.

If size of organ, *cœteris paribus*, is the measure of the vigor of function, it is of great moment in what region of the brain the organs are largest—whether in the animal, moral, or intellectual. On this preponderance depends the character. Two brains may be exactly alike in size generally, yet the characters may be perfect contrasts to each other.

It is held by phrenologists—1. That by accurate observation of human actions, it is possible to discover the strength of the dispositions and intellectual powers of men; 2. That the form of the brain can, in normal subjects not beyond middle age, be ascertained with sufficient accuracy from the external form of the head—the brain, though the softer substance, being what determines the shape of the skull; 3. That the organs or parts of which the brain is composed appear on its surface in folds or convolutions, which have a well-ascertained fibrous connection with the *medulla oblongata*, which unites the brain to the spinal cord; 4. That the brain being divided into two equal parts called *hemispheres*, in each of which the same organ occurs, all the organs are double, like the ears and eyes: see BRAIN. But when the term *organ* is used, both organs are meant.

It is true that where strength is most needful, the skull is thicker than at other places; but this is not overlooked by phrenologists, nor do they fail to warn observers against mistaking for signs of cerebral development the bony processes and ridges which serve for the attachment of muscles to the skull: see SKULL. They recognize also, as we shall see, the uncertainty often occasioned by the frontal sinus.

Besides the brain proper, there is a smaller brain, lying below the hinder part of the main brain, and called the *cerebellum*.

The brain is divided by phrenologists into the *anterior*, *middle*, and *posterior lobes*. The anterior lobe contains the organs of the intellectual faculties; the posterior lobe and lower range of the middle lobe are the regions of the animal propensities; while the moral sentiments are stated to have their organs developed on the top or coronal region of the head.

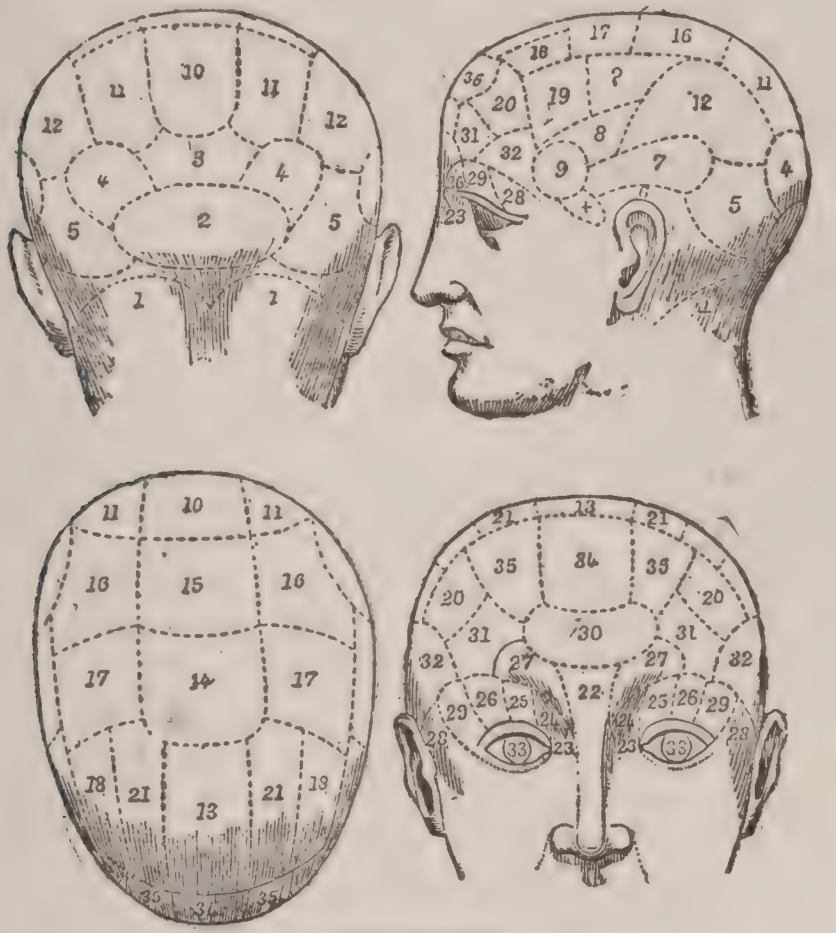
Phrenologists distinguish between *power* and *activity* in the mental faculties. Power, in whatever degree possessed, is *capability* of feeling, perceiving, or thinking; while activity is readiness and quickness in the exercise of power.

The powers of mind, as manifested by the organs, are called *faculties*. A faculty may be defined to be a particular power of thinking or feeling. A faculty is regarded as elementary or primary—1. When it exists in one kind of an animal, and not in another; 2. When it varies in the two sexes of the same species; 3. When it is not in proportion to the other faculties of the same individual; 4. When it appears earlier or later in life than the other faculties; 5. When it may act or repose singly; 6. When it is propagated from parent to child; and 7. When it may singly preserve its soundness, or singly become deranged or extinct.

The faculties are usually divided by phrenologists into two orders—FEELINGS and INTELLECT, or AFFECTIVE and INTELLECTUAL FACULTIES. The Feelings are divided into two genera—the *Propensities* and the *Sentiments;* while the Intellectual embrace the *Perceptive* or

Knowing, and the *Reflective*, *Faculties*. This classification, however, is avowedly imperfect.

The following is a representation of the human head in four points of view, showing the positions of the cerebral organs, according to Combe:



AFFECTIVE.

I.—Propensities.

1. Amativeness.
2. Philoprogenitiveness.
3. Inhabitiveness or Concentrativeness.
4. Adhesiveness.
5. Combativeness.
6. Destructiveness.
   [Alimentiveness.]
   [Love of Life.]
7. Secretiveness.
8. Acquisitiveness.
9. Constructiveness.

II.—Sentiments.

10. Self-esteem.
11. Love of Approbation.
12. Cautiousness.
13. Benevolence.
14. Veneration.
15. Firmness.
16. Conscientiousness.
17. Hope.
18. Wonder.
19. Ideality.
20. Wit or Ludicrousness.
21. Imitation.

INTELLECTUAL.

I.—Perceptive

22. Individuality.
23. Form.
24. Size.
25. Weight.
26. Coloring.
27. Locality.
28. Number.
29. Order.
30. Eventuality.
31. Time.
32. Tune.
33. Language.

II.—Reflective.

34. Comparison.
35. Causality.

1. *Amativeness*, or sexual love, is believed to have for its organ the cerebellum, or at least a portion of it. As the basis of domestic life, this faculty is of great importance, and its regulation has ever been one of the prime objects of moralists and legislators.

2. *Philoprogenitiveness*, or love of offspring, is generally strongest in the female. Its organ is one of the easiest to distinguish in the human head. Those who are flat and perpendicular there, instead of being delighted, are annoyed by children. The feeling is said to give a tender sympathy with weakness and helplessness in general. The most savage races must have affection for their young, or they would become extinct. The organ, like the other cerebral parts, may become diseased; and insanity on the subject of children often occurs.

3. *Inhabitiveness* (called by Combe *Concentrativeness*) has its organ immediately above the preceding. Dr. Gall did not discover its function; and Dr. Spurzheim, observing it large in persons attached to their native place, or any place in which they had long dwelt, called it *Inhabitiveness*. Combe thought it has a more extended sphere of action. He observed it large in those who can detain continuously their feelings and ideas in their minds; while the feelings and ideas of others pass away like the images in a mirror, so that they are incapable of taking systematic views of a subject, or *concentrating* their powers to bear on one point. The organ is stated as only probable, till further facts are obtained.

4. *Adhesiveness.*—The organ of this feeling was discovered by Gall, from being found very large in a lady remarkable for warmth and steadiness in her friendships. It attaches men and gregarious animals to each other, and is the foundation of that pleasure which mankind feel in bestowing and receiving friendship, and in associating with each other. Acting with Amativeness, it gives constancy and duration to the attachment of the married. Generally speaking, Adhesiveness is strongest and its organ largest in woman.

5. *Combativeness.*—Dr. Gall discovered the organ of this propensity by a vast number of observations on the heads of persons fond of fighting. Dr. Spurzheim extended its function to *contention* in general, whether physical or moral. Those deficient in it show that over-gentle and indolent character which yields to aggression, is easily repelled by the appearance of difficulty and trouble, and naturally seeks the shades and eddy-corners of life.

6. *Destructiveness.*—The propensity to destroy is abundantly manifested by man and carnivorous animals; and when too strong or ill-regulated is the source of cruelty and wanton mischief. As a defensive power, it is of high utility. Anger, resentment, and indignation spring from it. A small endowment is one of the elements of a 'soft' character; while persons who have much of it are generally marked by an energetic and probably fierce and passionate character.

Alimentiveness and *Love of Life.*—Some of the recent phrenological works treat, in this part of the order of the faculties, of a faculty of Alimentiveness, or the propensity to eat and drink, and also of another which follows viz., Love of Life. The first being represented as no more than *probable*, and the second as only *conjectural*, they have no number allotted to them on the bust. The place assigned to Alimentiveness is marked by a cross on the side-view of the bust. Combe suggests that the organ of the Love of Life is probably a convolution at the base of the middle lobe of the brain, the size of which cannot be ascertained during life.

7. *Secretiveness* is the propensity to conceal, which in excess assumes the form of cunning. It helps animals both to avoid and to prey upon each other. In abuse, it leads to lying, hypocrisy, and fraud, and with Acquisitiveness disposes to theft and swindling. The organ is subject to disease, and cunning madmen are difficult to deal with. Disease here often leads to belief in plots and conspiracies formed against the patient.

8. *Acquisitiveness.*—The existence of a cerebral organ for the desire of property is held by phrenologists to prove that this is not, as many have thought, a derived or secondary tendency. It is what Lord Kames calls the 'hoarding appetite.' This explains the miser's desire to accumulate money, without regard to its use in the purchase of other enjoyment. When the organ is diseased, persons in easy circumstances are sometimes prone to pilfer everything of value, and often of no value, which comes in their way.

9. *Constructiveness* is the impulse to fashion and construct by changing the forms of matter. Many of the inferior animals possess it, e.g., the beaver, bee, and birds. Physical nature consists of raw materials; and Constructiveness prompts and enables man to adapt these to his purposes.

10. *Self-esteem* is the source of that self-complacency which enhances the pleasures of life, gives the individual confidence in his own powers, and enables him to apply them to the best advantage. It is sometimes called proper pride, or self-respect, in which form it aids the moral sentiments in resisting temptations to meanness and vice. Its deficiency renders a man too humble, and the world takes him at his word, and pushes him aside. Its excess produces pride, arrogance, selfishness, disobedience, and tyranny. Self-esteem becomes insane perhaps more frequently than any other faculty, and then shows itself in extravagant notions of self-importance. Such maniacs fancy themselves kings, emperors, and even the Supreme Being. The organ is generally larger in men than in women; and more men are insane from pride than women.

11. *Love of Approbation* is the desire of the good opinion, admiration, and praise of others. It is a serviceable, though not necessarily in itself the noblest, guard on morals as well as on manners. The loss of character, to those largely endowed with this desire, is worse than death. If the moral sentiments be strong, the desire will be for honest fame; but in meaner characters, the love of glory is a passion that has deluged the world

with blood in all ages. Shamelessness is the effect of its deficiency, often observed in criminals. The organ oftener becomes diseased in women than in men, as in women it is more active than in the other sex generally.

12. *Cautiousness.*—The organ of this faculty is found large in persons much troubled with fears, hesitations, and doubts. Its normal character is well expressed by its name. When diseased, as it often is, the organ produces causeless dread of evil, despondency, and often suicide.

13. *Benevolence* is the desire to increase the happiness and lessen the misery of others. When strong, it prompts to active, laborious, and continued exertions, and, unless Acquisitiveness be powerful, to liberal giving to promote its favorite object. Unregulated by Conscientiousness and Intellect, Benevolence degenerates into profusion and facility. It often coexists with Destructiveness in great force; as it did in Burns, whose poem on a Wounded Hare expresses both feelings highly excited.

14. *Veneration* has for its object *whoever* and *whatever is deemed venerable* by the individual. One man venerates what another treats with indifference, because his understanding leads him to consider that particular object as venerable, while his neighbor deems it otherwise. But any man with a large endowment of the organ will have a tendency to consider others as superior to himself. Veneration is the basis of loyalty; and, having the Deity for its highest object, it forms an element in religious feeling. So liable is its organ to disease, that high devotional excitement is one of the most common forms of insanity.

15. *Firmness* is the source of fortitude, constancy, perseverance, and determination; when too powerful, it produces obstinacy, stubbornness, and infatuation. The lack of it is a great defect in character. The English soldier is more persistent than the French, though in courage and spirit they are equal.

16. *Conscientiousness* gives the love of justice, but intellect is necessary to show on which side justice lies. The judge must hear both sides before deciding, and his very wish to be just will prompt him to do so. Conscientiousness not only curbs our faculties when too powerful, but stimulates those that are too weak, and incites us to duty even against strong inclinations. The existence of Conscientiousness as an independent element in the human constitution explains some apparent inconsistencies in human conduct—that a man, for instance, is kind, forgiving, even devout, and yet not just. The organ is commonly larger in Europeans than in Asiatics and Africans; very generally, it is deficient in the savage brain. When it is diseased, the insanity consists in morbid self-reproach, belief in imaginary debts, and the like.

17. *Hope* was regarded as a primary faculty by Spurzheim, but was never admitted by Gall, who considered it as a function of every faculty that *desires.* Dr. Spurz-

heim answered, that we desire much of which we have no hope. It produces gayety and cheerfulness, looks on the sunny side of everything, and paints the future with bright colors. When not well regulated, Hope leads to rash speculation, and, in combination with Acquisitiveness, to gambling, whether at the gaming-table or on the stock market or in the counting-house. It tends to make the individual credulous of promised good, and often indolent.

18. *Wonder.*—Dr. Gall found the organ of this faculty large in seers of visions and dreamers of dreams, and in those who love to dwell on the marvellous, and easily believe in it. Persons who have it powerful are fond of news, especially if striking and wonderful, and are always expressing astonishment; their reading is much in the region of the marvellous, tales of wonder, of enchanters, ghosts, and witches. When the sentiment is excessive or diseased, it produces that peculiar fanaticism which attempts miracles, and (with Language active) speaks in unknown tongues.

19. *Ideality.*—The organ of this faculty was observed by Dr. Gall to be prominent in the busts and portraits of deceased, and in the heads of a great number of living, poets: this confirmed to him the old classical adage, that the poet is born, not made. He called it the organ of Poetry. The name Ideality was given to it by Dr. Spurzheim. This faculty is said to delight in the perfect, the exquisite, the *beau-ideal*, the beautiful and sublime. The organ is usually small in criminals and other coarse and brutal characters, for it is essential to refinement. It prompts to elegance and ornament in dress and furniture, and tends to give a taste for poetry, painting, statuary, and architecture. A point of interrogation is placed on the bust on the back part of the region of this organ, conjectured to be a different organ, but one allied to Ideality. The existence of the faculty of Ideality is held by phrenologists to prove that the sentiment of beauty is an original emotion of the mind, and to settle the controversy on that subject: see ÆSTHETICS.

20. *Wit, or the Sentiment of the Ludicrous.*—The phrenological writers have discussed at great length, and with not a little controversy, the metaphysical nature or analysis of this faculty. We need not follow them into this inquiry, as most of them are agreed that by means of it we feel and enjoy the *ludicrous.*

21. *Imitation.*—Dr. Gall found the prominence of this organ accompanied by instinctive, often irrepressible mimicry. The tendency to imitate is evidently innate; from the earliest years, it makes the young follow the customs and the manner of speech of those around them, and so preserves a convenient uniformity in the manners and externals of society. Eminent actors always possess it strong, and by its means imitate the supposed manner, and even feel the sentiments, of their characters. Its organ is found large also in painters and sculptors of em-

inence. In its morbid states, the impulse to mimic becomes irresistible.

We now come to the Intellectual Faculties, or those which make us acquainted with things that exist, and with their qualities and relations. Dr. Spurzheim divided them into three genera—1. The External Senses; 2. The Internal Senses, or Perceptive Faculties; 3. The Reflecting Faculties.

The external senses, as generally received, are five in number—*Touch*, *Taste*, *Smell*, *Hearing*, and *Sight*. There seem to be two more—the *Sense of Hunger and Thirst*, and the *Muscular Sense* or that by which we feel the state of our muscles as acted on by force and resistance. Without this last sense, we could not keep our balance, or suit our movements to the laws of the mechanical world. Whether each sense has a special cerebral organ in addition to its external apparatus and nerves is a question regarded by phrenologists as still undetermined.

22. *Individuality*, the first in the list of the perceptive faculties, is not easily defined. It is said to take cognizance of individual objects as such, e.g., a horse or a tree. Other knowing faculties perceive the form, color, size, and weight of the horse, but Individuality is thought to unite all these, and give the idea of a horse. It is regarded as the storehouse of knowledge of things simply *existing*. When it is strong, without being accompanied by reflecting power, the mind is full of facts, but unable to reason from them. After puberty, the size of the organ of Individuality, as well as of the neighboring organs of Size, Weight, Coloring, and Locality—all situated behind the superciliary ridge of the skull—is often rendered doubtful by the existence of a hollow space, of uncertain width and extent, between the two plates of the skull. This hollow is called the *frontal sinus;* and when it is large, there may be a great projection of the bone over the eyes, without a corresponding projection of brain within. When this part of the skull is flat, however, the organs must be *at least* as defective as the flatness indicates. Owing to the source of uncertainty here pointed out, and the smallness of the organs behind the eyebrows, the functions of those parts of the brain are not regarded as being so well ascertained as those of the larger organs, nor will a cautious phrenologist be too ready to pronounce them large.

23. *Form.*—When the organ of Form is large, the eyes are wide asunder. Dr. Gall discovered it in persons remarkable for recognizing faces after long interval, even though perhaps only once and briefly seen. The celebrated Cuvier owed much of his success in comparative anatomy to his large organ of Form. Decandolle mentions that 'his [Cuvier's] memory was particularly remarkable in what related to forms, considered in the widest sense of that word; the figure of an animal seen in reality or in

drawing never left his mind, and served him as a point of comparison for all similar objects.'

24. *Size.*—Every object has size or dimension; hence a faculty seems necessary to cognize this quality. The supposed organ is situated at the inner extremities of the eyebrows, where they turn upon the nose. A perception of size (including distance) is important to our movements and actions, and essential to our safety.

25. *Weight.*—A power to perceive the different degrees of weight and force likewise is essential to man's movements, safety, and even existence. Phrenologists generally have localized the organ of that power in the part of the brain marked 25 on the bust.

26. *Coloring.*—The organ of this faculty is large in great painters, especially great colorists, and gives an arched appearance to the eyebrow—e.g., in Rubens, Titian, Rembrandt, Salvator Rosa, Claude Lorraine. In cases of color-blindness, it is found small. Many persons, though able to distinguish colors, have no perception of their harmonies: for this perception, a higher endowment of the faculty seems requisite.

27. *Locality.*—Dr. Gall was led to the discovery of this faculty by comparing his own difficulties with a companion's facilities, in finding their way through the woods, where they had placed snares for birds, and marked nests, when studying natural history. Every material object must exist in some part of space, and that part of space becomes *place* in virtue of being so occupied, or in virtue of its relation to objects. Objects themselves are cognized by Individuality; but their place, the direction where they lie, the way to them, fall within the sphere of Locality. Its organ is large in those who find their way easily, and vividly remember places in which they have been. It materially aids the traveller, and is supposed to give a love for travelling. The organ was large in Columbus, Cook, Park, Clarke, and other travellers.

28. *Number.*—The organ of this faculty is placed at the outer extremity of the eyebrows and angle of the eye. It occasions, when large, a fulness or breadth of that part of the head, and often pushes downward the external corner of the eye. When it is small, the part is flat and narrow between the eye and the temple. Dr. Gall called the faculty *le sens des rapports des nombres* (The Sense of the Relations of Numbers), and assigned to it not only arithmetic, but mathematics in general. Dr. Spurzheim more correctly limits its functions to arithmetic, algebra, and logarithms; geometry being the products of other faculties, particularly Size and Locality. Dr. Gall observed the organ first in a boy who could multiply and divide, mentally, 10 or 12 figures by three figures, in less time than expert arithmeticians could with their pencils. Many such instances are on record.

29. *Order.*—The organ of this faculty is said to be large in those remarkable for love of method, neatness, arrangement, and symmetry, and who are annoyed by

confusion and irregularity. In savages, whose habits are slovenly, filthy, and disgusting, the organ is comparatively small.

30. *Eventuality.*—The organ is situated in the very centre of the forehead, and, when large, gives to this part of the head a rounded prominency. Individuality has been called the faculty of *nouns;* Eventuality is the faculty of *verbs.* The first perceives merely things that exist; the other, motion, change, event, history. The most powerful *knowing* minds have a large endowment of both Individuality and Eventuality; and such persons, even with moderate reflecting capability, are the clever men in society—the acute men of business—the ready, practical lawyers. The organ of Eventuality is generally well developed in children, and their appetite for *stories* corresponds.

31. *Time.*—Some persons are called walking timepieces; they can tell the hour without looking at a watch; and some even can do so, nearly, when waking in the night. The impulse to mark time is too common, too natural, and too strong, not to be the result of a faculty; it is an element in the love of dancing, almost universal in both savage and civilized man.

32. *Tune.*—The organ of Tune is large in great musicians; and when it is small, there is incapacity to distinguish either melody or harmony. The great bulk of mankind possess it in moderate endowment, so as to be capable in some degree of enjoying music. Those in whom it is large and active become, in all stages of society, distinguished artists, exercising a peculiar power over their fellow-creatures, so as to rouse, melt, soothe, and gratify them at pleasure. But the gift, in this active form, is liable to be much modified according as it is accompanied by Adhesiveness, Combativeness, Ideality, Benevolence, Wit, and other faculties.

33. *Language.*—The comparative facility with which different men clothe their thoughts in words, and learn to repeat them by heart, corresponds with the size of the organ of Language, which is situated on the superorbitar plate, immediately over the eyeball, and, when large, pushes the eye outward, and sometimes downward; producing, in the latter case, a wrinkling or pursing of the lower eyelid. Verbal memory is strong or weak, without relation to the strength or weakness of the memory of things, forms, or numbers.

The Perceptive Organs are mostly called into activity by *external* objects; but internal causes often excite them, and objects are then perceived which have no external existence, but which, nevertheless, the individual may believe to be real. This is the explanation of visions and ghosts, and of the fact that two persons do not see the same spectres at the same time. Excess or disease in the organ of Wonder predisposes to belief in the marvellous and supernatural, and probably stimulates the Perceptive Organs into action, when spectral illusions are the consequence.

34. *Comparison.*—Dr. Gall discovered the organ of this faculty in a man of science who reasoned chiefly by means of analogies and comparisons, and rarely by logical deductions. The middle of the upper part of his forehead was very prominent. The precise nature of the faculty has been much disputed among phrenologists, but they seem to agree that the perception of analogy depends on it. Every faculty, we are told, can compare its own objects: Coloring can compare colors; Weight, weights; Form, forms; Tune, sounds; but Comparison can compare a color with a note, or a form with a weight, etc. Analogy is a comparison not of things, but of their relations.

35. *Causality.*—This is regarded as the highest and noblest of the intellectual powers. Dr. Spurzheim so named it from believing that it traces the connection between *cause* and *effect*, and recognizes the relation of ideas to each other in respect of *necessary consequence.* Some metaphysicians have held that we have no idea of cause, but see only sequence, or one event following another: see CAUSE. It is true that we do see sequence; but we have a *third* idea—that of power, agency, or efficiency, existing in some way in the antecedent, to produce the consequent. Whence do we get this third idea? From a distinct faculty, Causality. It is a large ingredient in wisdom.

The phrenologists have confined their attention chiefly to the organs of the brain, and the various faculties of which these are the instruments. The former writers on mind—Reid, Stewart, Brown, and others—gave, on the contrary, their chief care to the mental acts called Attention, Perception, Conception, etc., which they considered as faculties. The phrenologist does not overlook the importance of this department of mental philosophy, but differs from the metaphysicians in considering perception, conception, memory, etc., as only *modes* in which the real faculties above described *act.* This distinction is one of great importance.

According to the phrenologists, the faculties are not mere passive susceptibilities; they all tend to action. When duly active, the actions that they produce are proper or necessary; in excess or abuse, they are improper, vicious, or criminal. Small moral organs do not produce abuses; but they reveal a tendency toward a lack of the will to prevent the abuse of the animal organs; while larger moral organs reveal the tendency to such prevention—thus, small Benevolence is not cruel, but it does not offer sufficient control to Destructiveness, which then impels to cruelty. *Cæteris paribus*, large organs indicate the greatest, and small the least, tendency to act—each faculty producing the feeling or idea peculiar to itself. In active constitutions, the brain partakes of the general activity, and comes more readily into play than where the constitution or temperament is lymphatic. Health and disease, exercise and inaction, nutrition and starvation, also have great influence in modifying both the power of the cerebral faculties and their readiness to act. Moreover, when certain faculties have been much exercised for a series of generations in a family, they are apt to be manifested in greater strength and activity than where no such hereditary influence exists. Seeing that all the organs tend to action, each, it is concluded, must have a legitimate sphere of action, and be necessary for the welfare of man.

The PROPENSITIES and SENTIMENTS cannot be called into action by the will. We cannot fear, or pity, or love, or be angry, by willing it. But *internal* causes may stimulate the organs, and then, whether we will or not, their emotions will be felt. Again, these feelings are called into action in spite of the will, by the presentation of their *external* objects—Cautiousness, by objects of terror; Love, by beauty; and so on. The excitability of the feelings, whether stimulated from within or without, is increased by activity of the temperament. Insanity is a frequent result of over-activity of the propensities and sentiments. These may be diseased and yet the intellect sound. The converse also is true. When an organ is small, its feeling cannot be adequately experienced. The will can *indirectly* excite the propensities and sentiments by setting the intellect to work to find externally, or conceive internally, the proper objects. Lastly, these faculties do not form ideas, but simply feel; and therefore have no memory, conception, or imagination.

The PERCEPTIVE and REFLECTING FACULTIES, or the Intellect, form ideas, perceive relations, and are subject to, or rather, on one theory, constitute, the Will; and they minister to the affective faculties. They may be excited by external objects and by internal causes. When excited by the presentation of external objects, these objects are *perceived*, and this *act* is called PERCEPTION. It is the lowest degree of activity of the intellectual faculties; and those who are deficient in a faculty cannot perceive its object.—CONCEPTION also is a mode of action of the faculties, not a faculty itself. It is the activity of the faculties from internal causes, either willed, or involuntary from natural activity.—IMAGINATION is Conception carried to a high pitch of vivacity.—MEMORY, too, is not a faculty, but a mode of action. There is no such thing as the *general* memory of the metaphysicians, but every intellectual faculty has its own memory. Memory differs from Conception and Imagination in this, that it recollects *real* objects or events which it has actually perceived, and adds the consciousness of time elapsed since they were perceived. The other named modes of action do not require realities or time.—JUDGMENT is, properly, the perception of adaptation, fitness, and necessary consequence: this is a mode of action of the reflecting powers. In a certain sense, the Perceptive Faculties may each be said to possess judgment—e. g., Coloring judges of colors; Form, of forms; Tune, of music. By the word 'judgment,' however, is meant right reasoning, sound deciding. To this, a proper balance of the affective faculties is essential. There can be no sound judgment where any of the feelings are excessive.—CONSCIOUSNESS is the knowledge which the mind has of its own existence and operations. —ATTENTION is not a faculty, but the application, or *tention*, of any or all of the intellectual faculties.—ASSOCIATION is the succession of ideas in the mind, each seeming to call up that which succeeds; so that in our waking-hours the mind is never without an idea passing through it: this is a state or condition of the faculties, not a faculty.—PASSION is any faculty in excess: Love is the passion of Amativeness (in sexual love), in union (in the love of friendship) with Adhesiveness and (in religious love) with Veneration; Avarice is the passion of Acquisitiveness; Rage, of Destructiveness.—PLEASURE and PAIN, JOY and GRIEF, also belong to each faculty, according as it is agreeably or disagreeably affected.—HABIT is the power of doing anything well, acquired by frequently doing it. But before it can be done at all, there must be the faculty to do it, however awkwardly. —TASTE, held by Stewart to be a faculty, and to be acquired by habit, seems the result of a harmonious action of all the faculties.

Such is an outline of the system propounded by the phrenologists. So far as it shall be confirmed by the mature experience and observation of competent inquirers, the facts and principles which it unfolds must be of great practical value to mankind. The study of the mutual influence of the mind and body has ever been recognized by wise and observant men as one of high importance, though of great difficulty; and certainly Gall and his followers have not only given a strong impulse to that study, but have thrown much light on the diversities of human character, and accumulated a large body of facts of a kind previously overlooked. Much, it is admitted, still remains to be discovered. 'No phrenologist,' says Combe, 'pretends that Gall's discoveries are perfect; they are far from it, even as augmented and elucidated by his followers; but I am humbly of opinion that, in their great outlines, his doctrines are correct representations of natural facts. . . . The future of phrenology will probably exhibit a slow and gradual progress of the opinion that it is true and important; and only after this stage shall have been passed will it be seriously studied as science. Hitherto this has not been done: the number of those who have bestowed on it such an extent of accurate and varied observation and earnest reflection as is indispensable to acquiring a scientific knowledge of chemistry, anatomy, natural philosophy, or any other science, is extremely small; and the real knowledge of it, on the part of such as continue, through the press and in public lectures, to oppose it, appears to me scarcely greater than it was in 1815 and 1826,' when it was ridiculed in the *Edinburgh Review*.

In considering the claims of phrenology, two questions should not be confounded. One is—How far the functions of the different parts of the brain have been established by observation of extreme instances of their large and small development?—the other, To what extent the facts so ascertained can be applied physiognomically in practice? Gall disclaimed the ability to distinguish either ill-defined modifications of forms of the skull, or the slighter shades of human character (*Sur les Fonctions du Cerveau*, iii. 41); nor, we believe, did he or Spurzheim ever pretend to estimate the size of *every* organ in a single brain. By attempting too much in these directions some of their disciples have helped to prolong the incredulity with which phrenology is still widely regarded. It is important to consider, moreover, that all systems of philosophy based on, or even involving, a supposed claim in Phrenology that man's mental and moral faculties are *results* of his bodily organs, are based on a misapprehension. P. properly relates not to the various bodily organs of the brain as the causes of the various human faculties, but to those organs as the natural adjuncts, instruments, and indications of those faculties. The mistake at this point is easy, and has been frequent—of beginning with the bodily organs as instruments and indications of mental and moral powers, and gradually veering to the mere assumption that they are the sources of those powers.

For the titles of numerous books on Phrenology, see GALL (F. J.), SPURZHEIM (J. G.), and COMBE (G.); also an article in the *British and Foreign Medical Review*, ix. 190. Of other important works bearing on or criticising phrenology are Dr. Laycock's *Mind and Brain, or the Correlation of Consciousness and Organization* (2 vols. Edin. 1860); his article on Phrenology in the 8th ed. of the *Encyc. Brit.;* article on Phrenological Ethics in the *Edinburgh Review*, 1842, Jan., lxxiv. 376; Aug. Comte's *Philosophie Positive*, iii. (or Miss Martineau's transl., i. 466); Sir Benj. C. Brodie's *Psychological Inquiries*, Dialogue vi. (Lond. 1854); G. H. Lewes's *Biog. Hist. of Philos.*, 629 (Lond. 1857); Samuel Bailey's *Letters on the Philosophy of the Human Mind*, 2d Series, Letters xvi.-xxi. (Lond. 1858); and Prof. Bain *On the Study of Character, including an Estimate of Phrenology* (Lond. 1861). Sir William Hamilton's objections, mostly published many years since, now appended to his *Lectures on Metaphysics*, i. 404 (Edin. 1859), were discussed in the *Phren. Jour.*, iv., v., and are remarked on by Combe in his work *On the Relation between Science and Religion*, pref., p. xvii. (Edin. 1857).

PHRENOMAGNETISM, n. *frĕn'ō-măg'nĕt-ĭzm* [Gr. *phrēn*, the mind, and Eng. *magnetism*]: excitement of the organs of the brain by mesmeric passes or magnetic influence.

PHRENSY, n., or Phrenzy, n. *frĕn′zĭ* [L. and Gr. *phrenēsis;* F. *phrénésie* or *frénésie*, delirium, phrensy—from Gr. *phrēn*, the mind]: delirium, high mental excitement or distraction. Phrensied, a. *frĕn′zĭd*, affected with madness. Phren′siedly, ad. *-lĭ*: see Frenzy.

PHRYGA′NEA: see Caddice.

PHRYGIA, *frĭj′ĭ-a:* country in Asia Minor, whose extent and boundaries varied very much at different periods of ancient history. In prehistoric ages it is believed to have comprised the greater part of the peninsula; but at the time of the Persian invasion it was limited to the districts known as Lesser P. and Greater P.—the former stretching from the Hellespont to Troas (inclusive), the latter occupying a central portion of Asia Minor. The inland boundaries of Lesser P. are not well ascertained; but Greater P. was bounded n. by Bithynia and Paphlagonia, e. by Cappadocia and Lycaonia, s. by the Taurus range, w. by the maritime countries of Mysia, Lydia, and Caria. At a later period it was considerably reduced by the formation of Galatia (q.v.) and the extension of Lycaonia. P. was in general a high and somewhat barren plateau, though its pastures supported immense flocks of sheep, noted for fineness of their wool, as indeed they still are. The most fertile part was the valley of the Sangarius; but the most beautiful and populous district was the s.w., at the base of the Taurus, where the Mæander and other streams had their rise. The mountains and streams yielded gold; Phrygian marble was anciently famous, and the cultivation of the vine appears to have been extensive.

The origin of the Phrygians is one of the mysteries of ancient ethnology. Some think that they were settled at a very remote period in Europe, and that they emigrated from Thrace into Asia Minor; and Xanthus, Herodotus, and Strabo certainly speak of such a migration. Xanthus places it after the Trojan war; but if there be any truth in the tradition at all, it can refer only to a return of some tribes to the cradle of the race in the valley of the Sangarius, for the Phrygians were regarded as one of the oldest races (if not the very oldest) in Asia Minor. Instead of seeking their origin in Thrace, the best classical ethnologists seek it in the neighboring highlands of Armenia, whence the Phrygians are believed to have spread, at a period long before the dawn of authentic history, over the greater part of the Peninsula, and thence to have crossed into Europe, and occupied the greater part of Thrace, Macedonia, and Illyria; while the mythic Pelops, who colonized the Peloponnesus, and gave it his name, was said by tradition to be a Phrygian. In both Greek and Latin poetry the Trojans are called also Phrygians; and the same name is applied to other nations of Asia Minor, e.g., the Mydonians and Mysians. In Thrace, too, many of the names of places were the same as in Troas; and it has now been demonstrated that the Armenian, Phrygian, and Greek languages are akin, so that the peoples speaking the former two, like those speaking the latter, belong to the great Aryan branch of the human family. The Phrygians began to decline in power and numbers after the Trojan war. They were—if we can make anything like historic fact out of the mythic narratives of that early time—pushed out of Europe by the Illyrians in the n. and the Macedonians in the s., while in Asia Minor the rise of the Semitic Assyrians also depressed and weakened them, by breaking up the integrity of their territory. The whole of the s. coast of the peninsula was occupied by Semitic invaders; the Lydians and Cappadocians were of Syro-Phœnician origin; and Strabo speaks of structures of Semiramis as far n. as Pontus. Their language, manners, and religion even, underwent radical changes—hence the great difficulty in ascertaining their original characteristics. After being subjugated by Crœsus, they passed, at the dissolution of the Lydian monarchy, under the sway of Cyrus; and only from this date are they brought within the pale of positive history. Their country formed part of the empire of Alexander, and subsequently belonged to the Syrian Seleucidæ, to the kings of Pergamum, and to the Romans, who obtained possession of it B.C. 133.

The Phrygians had not a warlike reputation among the ancients; but though in later times commonly described as indolent and stupid, yet, like negroes, they were of a mystic and excitable disposition. Their religious orgies, accompanied by wild music and dancing, are frequently mentioned by classic writers, and appear to have exercised a very material influence on Hellenic worship. Cybele, 'the great mother of the gods,' was the chief Phrygian divinity; others were Sabazius (Dionysus), Olympus, Hyagnis, Lityerses, and Marsyas.

PHRYGIAN, a. *frĭj'ĭ-ăn:* pertaining to *Phrygia*, in Asia Minor; applied to a wild and stirring kind of music produced by the ancients from the flute: N. a certain light spongy stone. PHRYGIAN CAP, pointed cap with the point turned over toward the front; an anc. form of headpiece considered by the Greeks as oriental because in vogue in Asia Minor: the modern cap of liberty is of this form.

PHRYNE, *frī'nē:* famous Greek courtesan: in the time of Alexander the Great, B.C. 4th c.; b. Thespiæ in Bœotia; daughter of Epicles. She seems to have lived in Athens. Her position in life was originally very humble, and she is said to have earned a livelihood by gathering capers; but as the fame of her marvellous beauty spread, she obtained numerous lovers, who lavished gifts on her so profusely that she became enormously rich. In proof of this, the story goes that she offered to rebuild the walls of Thebes, if the citizens would allow her to place this inscription on them: 'Alexander destroyed them; Phryne, the courtesan, rebuilt them.' The Thebans declined the proposal. Her enemies accused her of profaning the Eleusinian mysteries. Summoned before the tribunal of the Heliasts, she was defended by the rhetorician Hyperides, one of her lovers, who, perceiving that his eloquence was failing to convince the judges, threw back her veil, and displayed her naked shoulders and bosom. She was immediately acquitted, and carried in triumph to the Temple of Venus. The famous picture of Apelles (q.v.)—the 'Venus Anadyomene'—is said to have been a representation of P. Praxiteles, also one of her lovers, employed her as a model for his 'Cnidian Venus.'

PHTHAL′IC ACID, or Naphthal′ic Acid: see Naphthaline Group.

PHTHIRIASIS, n. *thĭ-rī′ă-sĭs* [Gr. *phtheiriāsis*—from *phtheir*, a louse]: a diseased condition in which lice are bred in and infest the body; cutaneous vermination.

PHTHISIS, n. *thī′sĭs* [Gr. *phthisis*, a wasting—from *phthiō*, I consume or waste away]: pulmonary consumption, a disease produced by tubercles in the lungs; called also 'pulmonary phthisis' (see Consumption). Phthisic, n. *tĭz′ĭk*, a wasting away; a person affected with phthisis; a slight tickling cough. Phthis′ical, a. *-ĭ-kăl*, belonging to phthisis; consumptive.

PHULOWDI, *fô-low′dē:* town of India, in the Rajpoot state of Joudpore, lat. 27° 8′ n. Pop. 15,000.

PHULWARA TREE: see Bassia.

PHYCOCHROME, n. *fī′kō-krōm* [Gr. *phukos*, sea-weed; *chrōma*, color]: the coloring matter in lichens and in the lower Algæ.

PHYCOCYANIN, n. *fī′kō-sī′ăn-ĭn*, or Phy′cocy′anine, n. *-ĭn* [Gr. *phukos*, sea-weed; *kuanos*, blue]: in *bot.*, the bluish coloring matter of Nostoc and other low Algæ.

PHYCOERYTHRIN, n. *fī′kō-ĕr′ĭth-rĭn*, or Phy′coer′ythrine, n. *-rĭn* [Gr. *phukos*, sea-weed; *er′uthros*, red]: in *bot.*, the red coloring matter, soluble in water, found in *Florideœ.*

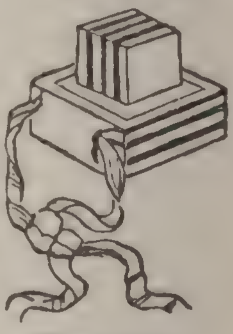
PHYCOGRAPHY, n. *fī-kŏg′ra-fĭ* [Gr. *phukos*, sea-weed; *graphē*, a drawing, a delineation]: delineation or description of sea-weeds.

PHYCOLOGY, n. *fī-kŏl′ŏ-jĭ* [Gr. *phukos*, sea-weed; *logos*, discourse]: the study of Algæ or sea-weeds: see Algæ.

PHYCOMATER, n. *fī′kō-mā′tėr* [Gr. *phukos*, sea-weed; Gr. *mētēr;* L. *mătĕr*, a mother]: in *bot.*, the gelatinous matter investing the sporules of certain Algæ, and in which they vegetate.

PHYCOXANTHIN, n. *fī′kō-zănth′ĭn*, or Phy′co′xanthine, n. *-ĭn* [Gr. *phukos*, sea-weed; *xanthos*, yellow]: in *bot.*, the same as 'diatomine'—which see under Diatomaceæ.

PHYLACTERY, n. *fĭ-lăk′tĕr-ĭ* [Gr. *phulaktē′rĭŏn*, a guard, an amulet—from *phulax*, a guard; *phulassō*, I watch]: among the *Jews*, a strip of parchment on which were written texts from the law, worn by devout persons on the forehead, arms, or breast, particularly by the Pharisees: in the early Christian Chh., a case for containing the relics of the dead. PHYLAC′TERED, a. *-tėrd*, wearing phylacteries. PHYLACTERIC, a. *fĭl′ăk-tĕr′ĭk*, or PHYL′ACTER′ICAL, a. *-ĭ-kăl*, pertaining to phylacteries.—*Phylacteries* were inscribed with certain passages from the Scripture (Ex. xiii. 1–10, 11–16; Deut. vi. 4–9, xi. 13–21), inclosed in small cases, and fastened to the forehead and the left arm (*Tefillin*)—also, in another form, to door-posts (*Mesusah*).—The use was in imagined accordance with Ex. xiii. 9–16, etc. The writing of phylacteries was in the hands of privileged scribes (*Soferim*) only, and many and scrupulous are the ordinances to be followed in this task. Only vellum of superior kind is to be used; the characters must be traced with the greatest care; no erasures or corrections are allowed; the lines and letters must be of equal length; etc. The case in which they are inclosed consists of several layers of calf-skin or parchment. Not the wearing, but the exaggerated form of the phylacteries worn by some of the Pharisees, is inveighed against by Christ.



Phylactery.

PHYLACTOLÆMATA, n. plu. *fĭl-ăk′tô-lē′mă-tă* [Gr. *phulak′tĭkos*, having the power to guard—from *phulassō*, I guard; *laimos*, the throat]: the division of the Polyzoa in which the mouth is provided with the arched valvular process, called the 'epistome.'

PHYLE, n. *fī′lē* [Gr. *phulē*]: a tribe; one of the divisions of the anc. Athenians: at first they were four, afterward ten.

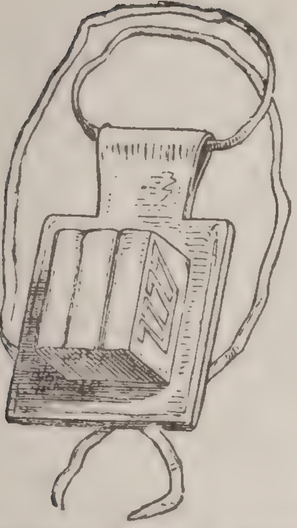
PHYLETIC, a. *fī-lĕt′ĭk* [Gr. *phuletikos*—from *phuletēs*, one of the same tribe; *phulē*, a tribe]: pertaining or relating to a tribe or race, especially of animals.

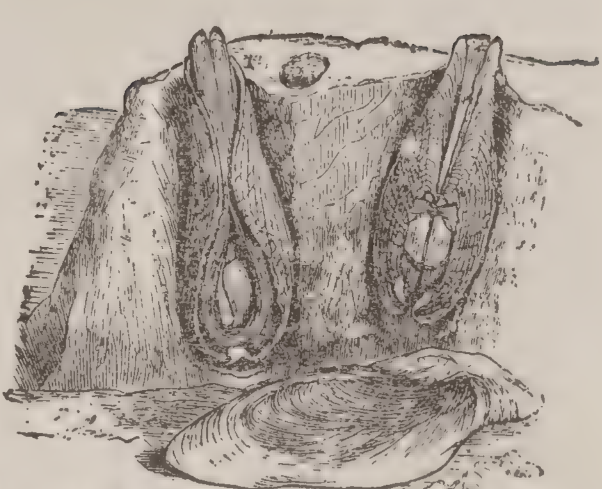
PHYLLA, n. plu. *fĭl′lă* [Gr. *phullon*, a leaf]: in *bot.*, the verticillate leaves which form the calyx or external envelope of the flower. PHYL′LARIES, n. plu. *-lă-rĭz*, the leaflets forming the involucre of composite flowers.

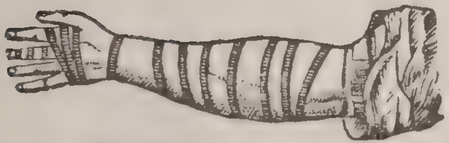
PHYLLIREA, n. *fĭl-lĭr′ĕ-ă* [Gr. *phillur′ĕă*, a certain tree or shrub like the privet, more correctly written *philurea*]: a genus of evergreen plants, very leafy, and of a dark-green foliage, ord. *Olĕācĕæ*.

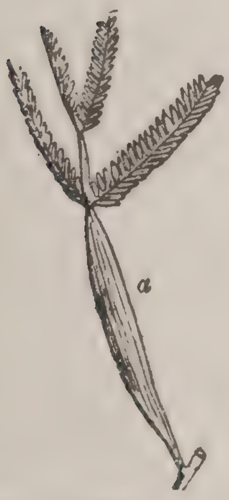
PHYLLOCYSTS, n. plu. *fĭl′lō-sĭsts* [Gr. *phullon*, a leaf; *kustis*, a cyst—from *kuō*, I hold]: the cavities in the interior of the hydrophyllia of certain oceanic Hydrozoa.

PLATE 6.

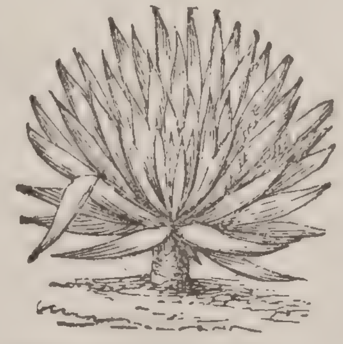

Phylactery, from an Original One.

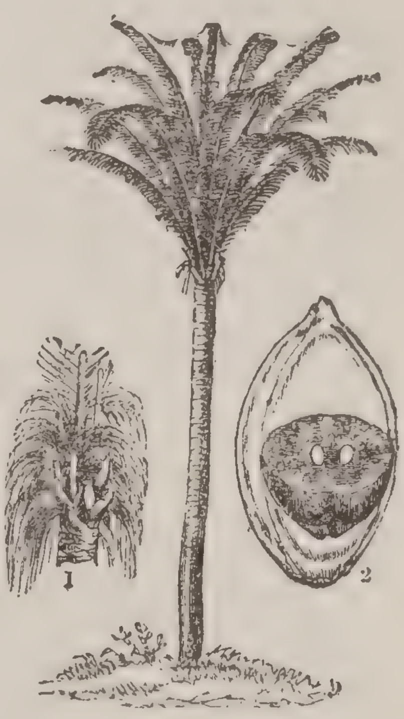

Pholades (*Pholas dactylus*) in Their Holes.


Phylactery for the Arm.

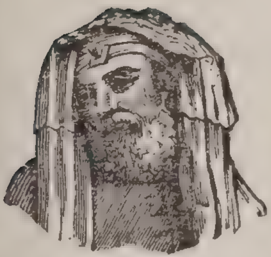


1. **Phyllodium** (*Acacia heterophylla*).

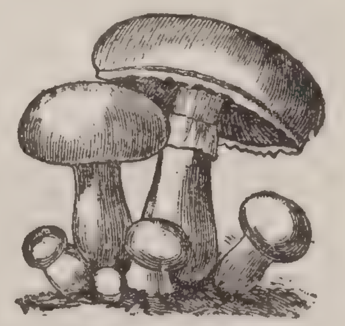

Phormium tenax.



Piassava Palm (***Attalea*** *funifera*): 1, Base of leaf stalks enlarged; 2, Coquilla-nut.


Phylactery for the Head.

Phonograph.—Type-laden Tin-foil.


Pileate.

PHYLLODIUM, n. *fĭl-lō′dĭ-ŭm*, PHYLLO′DE, n. *-lō′dē* [Gr. *phullon*, a leaf; *eidos*, appearance]: in *bot.*, a leaf-stalk developed into a flattened expansion like a leaf. PHYLLODY, n. *fĭl′lŏ-dĭ*, the change of an organ into true leaves; the substitution of true leaves for some other organ. PHYLLOID, a. *fĭl′loyd*, like a leaf. PHYLLOIDS, n. plu. *fĭl′loydz*, leaf-like appendages to the stems of Algæ.

PHYLLOGEN, n. *fĭl′lō-jĕn* [Gr. *phullon*, a leaf; *gennaō*, I produce]: in *bot.*, the single terminal and central bud from which leaves are produced in palms and many herbaceous plants; also called a ‘phyllophore.’

PHYLLOGRAPSUS, n. *fĭl′lō-grăp′sŭs* [Gr. *phullon*, a leaf; *graphō*, I write]: in *geol.*, a beautiful genus of graptolites from the Skiddaw rocks.

PHYLLOMANIA, n. *fĭl′lō-mā′nĭ-ă* [Gr. *phullon*, a leaf; *mania*, madness]: in *bot.*, an abnormal or unusual development of leaf-tissue.

PHYLLOME, n. *fĭl-lōm′* [Gr. *phullon*, a leaf]: in *bot.*, a leaf-structure; a structure morphologically equivalent to a leaf.

PHYLLOMORPHY, n. *fĭl′lō-mŏr′fĭ* [Gr. *phullon*, a leaf; *morphē*, form, shape]: in *bot.*, the substitution of leaves for other organs; same sense as ‘phyllody.’ PHYL′LOMOR′PHOSIS, n. *-mŏr′fŏ-sĭs*, the study of the succession and variation of leaves during different seasons.

PHYLLOPHAGOUS, a. *fĭl-lŏf′ă-gŭs* [Gr. *phullon*, a leaf; *phagein*, to eat]: leaf-eating.

PHYLLOPHORE, n. *fĭl′lō-fōr* [Gr. *phullon*, a leaf; *phorĕō*, I bear]: the terminal bud or growing point in palms; same sense as ‘phyllogen.’ PHYLLOPHOROUS, a. *fĭl-lŏf′ŏ-rŭs*, bearing or producing leaves.

PHYLLOPHYTES, n. plu. *fĭl′lō-fīts* [Gr. *phullon*, a leaf; *phuton*, a plant]: plants of any kind in which leaves can be observed.

PHYLLOPODA, n. plu. *fĭl-lŏp′ŏ-dă*, PHYLLOPOD, n. sing. *fĭl′lŏ-pŏd* [Gr. *phullon*, a leaf; *podes*, feet]: an order of Crustaceæ having leaf-like feet. PHYLLOPODES, n. plu. *fĭl-lŏp′ŏ-dēz*, in *bot.*, dead leaves in Isoetes.

PHYLLOPTOSIS, n. *fĭl′lŏp-tō′sĭs* [Gr. *phullon*, a leaf; *ptōsis*, a falling]: in *bot.*, the fall of the leaf.

PHYLLOSO′MA: spurious genus or family of crustaceans: see GLASS-CRABS.

PHYLLOSTOMIDÆ, *fĭl-lŏs-tŏm′ĭ-dē:* the family of Leaf-nosed Bats, order *Chiroptera.* There are about 63 species, all natives of S. America. The largest one is sometimes called the Vampire, but has no habit of sucking blood, the true vampires being small species of other genera. The curious nose appendage is probably an organ of touch. See BAT.

PHYLLOTAXIS, n. *fĭl′lō-tăks′ĭs*, or PHYL′LOTAX′Y, n. *-tăks′ĭ* [Gr. *phullon*, a leaf; *taxis*, order; *tassō*, I arrange]: the arrangement of the leaves on the axis or stem. PHYL′LOTAC′TIC, a. *-tăk′tĭk*, of or pertaining to.

PHYLLOXERA, n. *fĭl'lŏks-ē'ră* [Gr. *phullon*, a leaf; *xēros*, dry, parched]: genus of insects of order *Hemiptera*, sub-order *Homoptera*, type of a family, *Phylloxeridæ*, allied to the *Aphis* (q.v.) and *Coccus* (q.v.) families. The *Phylloxeridæ* attach themselves to various plants, on the juice of which they feed, and which they often injure or destroy. *P. vastatrix*, of this family, since 1865 has committed great devastation in the vineyards of France: it seems to have been brought from N. America. Great numbers of this insect appear on the roots of the vine, and their puncturings are so numerous and incessant, that the roots can no longer supply nutriment to the plant, which accordingly fades and dies. The *P. vastatrix* has been observed also on the leaves of the vine. It measures, when fully grown, only about $\frac{1}{33}$ of an inch in length. It is provided with a long, slender proboscis, which lies in a groove in its under side. Yellow in summer, it becomes brown at the end of autumn. Another variety, the OAK P. (*P. quercus*), appears on leaves of oak-trees.

PHYLLULA, n. *fĭl'lū-la* [Gr. *phullon*, a leaf; *oulē*, a scar, a cicatrix]: in *bot.*, the scar left on a branch or twig after the fall of a leaf.

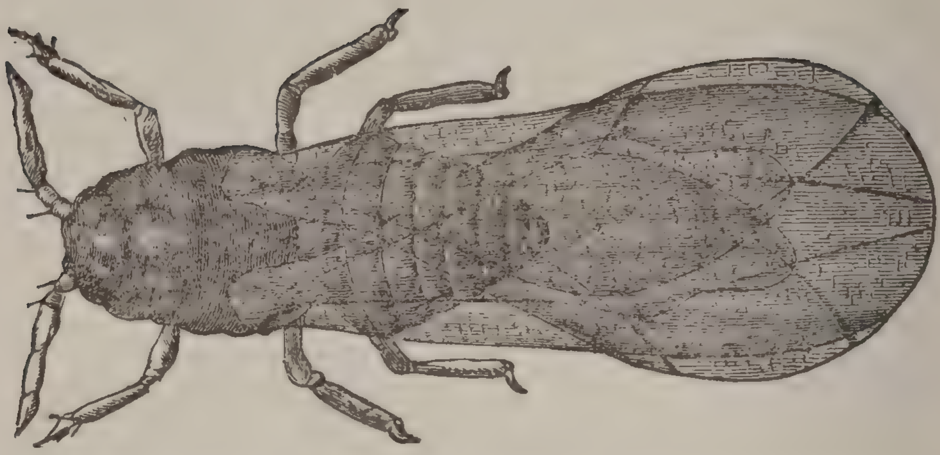
PHYLOGENY, n. *fī-lŏj'ĕ-nĭ* [Gr. *phulon*, a stock, a race—from *phuō*, I produce; *gennaō*, I generate, I produce]: the race-history of man or animals; the race-history of an animal as obtained from its development. PHYLOGENETIC, a. *fī'lō-jĕ-nĕt'ĭk*, pertaining to the race-history of an animal: see ONTOGENY.

PHYMA, n. *fī'mă* [Gr. *phuma*, a tumor—from *phuo*, I produce]: a tubercle on any external part of the body.

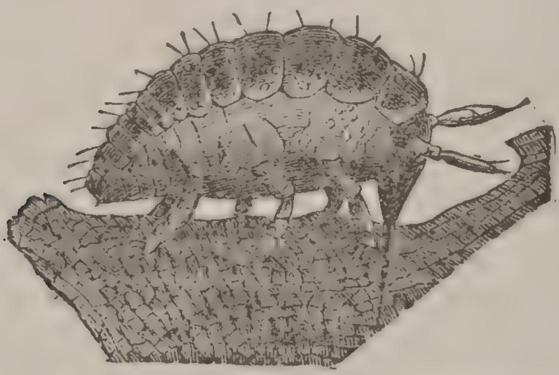
PHYSALIA, *fī-sā'lĭ-â:* genus of *Hydrozoans*, having an oval or oblong body, which consists in great part of an air sac, so that the creature floats on the surface of the sea, with numerous appendages of various kinds hanging from its under side. The shorter of these appendages are suckers, kept in constant motion for procuring prey, and which seem also to be employed in extracting nutriment from it, as the P. has no proper mouth nor alimentary canal. Among these shorter appendages, also, some seem to serve the purpose of reproduction by germination. The longer appendages, which are extremely long—those of a P. five or six inches in length being capable of extension to 12 or 18 ft.—are rope-like tentacles, possessing a remarkable stinging power, which is probably used for benumbing prey. It is a common trick with sailors to make a novice pick up a P., the beautiful colors of which always attract admiration. The stinging power is, however, such as not

Portuguese Man-of-War
(*Physalia pelagica*).

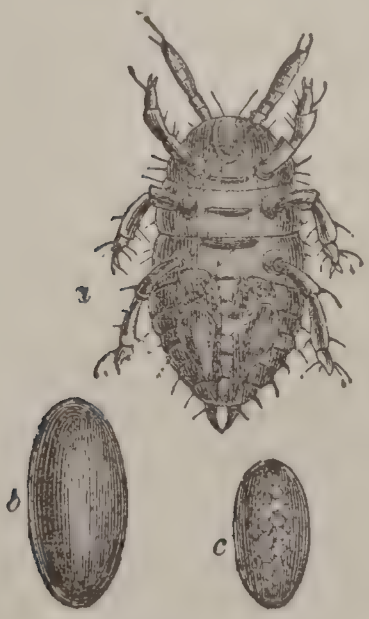
PLATE 7.



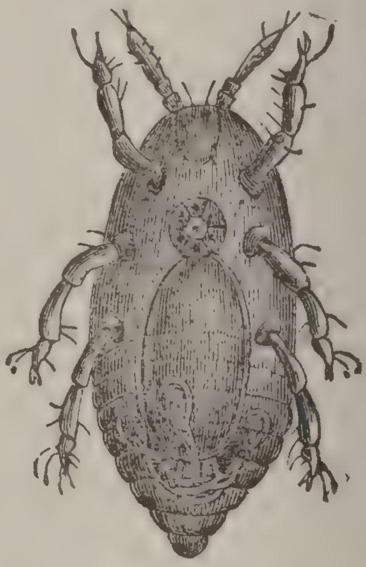
Winged female Phylloxera, living on the leaves and buds of the vine, and laying parthenogenetically two kinds of eggs, one developing into a wingless female, the other into a male.



Root-inhabiting Phylloxera, showing proboscis inserted into the roo



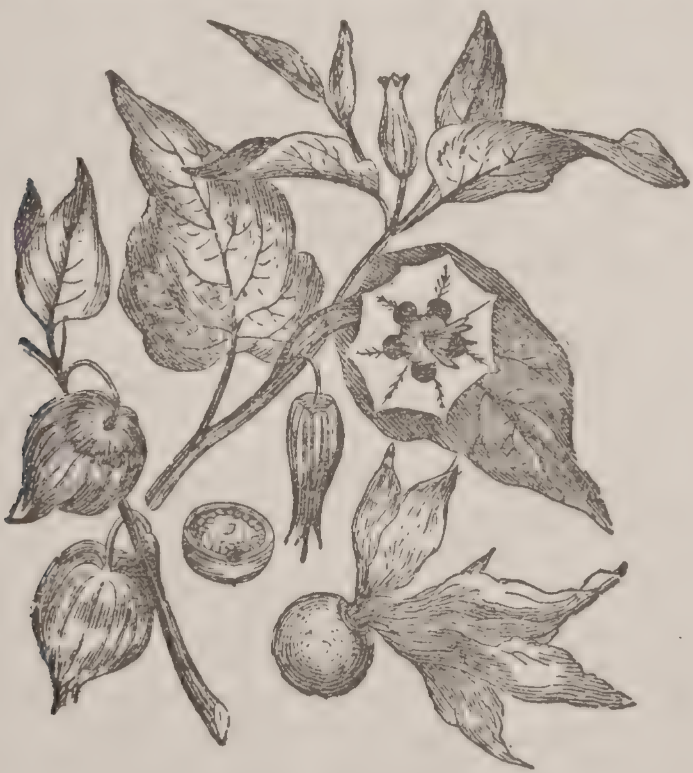
a, Male, produced from small egg *c*, laid by winged female; *b*, large egg from which the wingless female comes.



Wingless Female.

merely to produce local pain, but constitutional irritation. It was formerly supposed that the P. has the power of expelling air from its bladder, and sinking at pleasure in the sea; but Bennett's observations (*Gatherings of a Naturalist in Australia*) render it probable that it always floats on the surface, and is driven about by the winds. The name *Portuguese Man-of-War* is often popularly given to the species of P., and particularly to *P. pelagica*. The *Physaliæ* inhabit the seas of warm latitudes, but shoals of them are occasionally driven to coasts northward.

PHYSALIS, *fī'sa-lĭs* or *fis'al-ĭs:* genus of plants of nat. ord. *Solanaceæ*, remarkable for the calyx, which becomes large and inflated after flowering is over, and incloses the ripened berry. The species are annual and perennial herbaceous plants and shrubs, natives of temperate and warm climates, and widely scattered over the world. The COMMON WINTER CHERRY (*P. alkekengi*) is a perennial, native of s. Europe and great part of Asia, growing in vineyards and bushy places. The red berries have a sweetish sub-acid taste; they are eaten. This and *P. Peruviana*, with yellow berries, are known as 'strawberry tomato.' The native N. Amer. species are called 'ground-cherry.' The fruit of *P. angulata* is palatable, and that of P. *viscosa* is diuretic. There are 17 United States species. The berries were formerly employed in medicine.—The DOWNY WINTER CHERRY, or PERUVIAN GOOSEBERRY (*P. pubescens* or *P. Peruviana*), is an annual Amer. species, densely clothed with down; with heart-shaped leaves, yellow flowers, and yellowish berries, which are eatable.



Love-apple (*Physalis edulis*).

PHYSALITE, n. *fĭs′ă-līt* [Gr. *phūsaō*, I blow or puff up; *lithos*, a stone]: a coarse variety of topaz occurring in large crystals, so called from its swelling up under heat.

PHYSETER, n. *fī-sē′tėr* [Gr. *phusētēr*, a pair of bellows—from *phūsaō*, I puff]: the spermaceti whale: see Cachalot.

PHYSIC, n. *fĭz′ĭk* [Gr. *phusĭkos*, conformable or agreeable to nature—from *phusis*, nature: L. *physica;* It. *fisica;* F. *physique*, natural science]: science or knowledge of medicine; art of healing diseases; profession of a physician; remedies for diseases: specially, a medicine that purges: V. to treat with medicine; to purge; to heal. Phys′icking, imp. *-ĭk-ĭng*. Phys′icked, pp. *-ĭkt*. Phys′ical, a. *-ĭ-kăl*, pertaining to nature or natural productions; pertaining to the body or material things; perceptible to the senses; external. Phys′ically, ad. *-lĭ*. Physical education, the training of the body to increase and preserve health. Physical geography, a description of the earth in all its present relations to organic and inorganic nature (see Geography). Physical laws, the laws of nature. Physical science, the science which treats of inorganic bodies, their external appearance, properties, etc.—distinguished from *natural science* (see Physics, below). Physician, n. *fĭ-zĭsh′ăn*, one legally qualified to prescribe remedies for external or internal use in disease, as distinguished from a surgeon: a medical man: see Physicians, The Royal College of: Medical Codes: Medical Education of Women: Medical Practitioner: Medicine, History of. Physics, n. plu. *fĭz′ĭks*, science which treats of the properties of matter, the laws of motion, and the phenomena of nature; natural philosophy (see below). Phys′icist, n. *-ĭ-sĭst*, a student of nature; one skilled in physics. Phys′ico-logic, *-kō-*, logic illustrated by natural philosophy. Physico-theology, theology illustrated by natural philosophy.

PHYSI′CIANS, The Royal College of (of London): founded 1518 by the munificence of Thomas Linacre, priest and distinguished physician (1460-1524). In 1518, through the influence of Cardinal Wolsey, he obtained from Henry VIII. letters patent granting to John Chambre, himself, and Ferdinandus de Victoria, the acknowledged physicians to the king—together with Nicholas Halsewell, John Francis, Robert Yaxley, and all other men of the same faculty in London—to be incorporated as one body and perpetual community or college. They were permitted to hold assemblies, and to make statutes and ordinances for the government and correction of the college and of all who exercised the same faculty in London and within seven miles thereof, with an interdiction from practice to any individual unless previously licensed by the pres. and college. Linacre, first pres., held the office till his death. His house in Knightrider street, which he bequeathed to the college, continued in its possession till 1860. In 1825 the present edifice in

Pall-Mall East was opened under the presidency of Sir Henry Halford.

In 1540 an act was passed in which it was declared explicitly that 'surgery is a part of physic, and may be practiced by any of the company or fellowship of physicians'—a doctrine which in later times has been totally repudiated by the London collegiate body, who, until a few years ago, would not admit to their privileges a member of the Royal College of Surgeons unless he formally resigned his surgical diploma. In 1860 the presidency became an annual office, open to the fellows at large, who are also the electing body. As at present constituted, the college consists of Fellows, Members, Licentiates, and Extra-Licentiates. The *Fellows* are elected from members of at least four years' standing, who have distinguished themselves in the practice of medicine, or in medical or general science or literature. The government of the college is vested in the president and fellows only. The present *Members* consist of persons who had been admitted, before 1859, Feb. 16, licentiates of the college; of extra-licentiates who have complied with certain conditions; and of persons who have attained the age of 25 years, who do not dispense or supply medicine, and who, after being duly proposed, have satisfied the college 'touching their knowledge of medical and general science and literature,' and that they have 'been engaged in the study of physic during a period of five years, of which four years at least shall have been passed at a medical school recognized by the college.' No candidate is admissible if engaged in trade or connected with a druggist's business, or who even practices medicine in partnership with another practitioner, so long as the partnership lasts, or who refuses to publish, when required, the nature and composition of any remedy that he uses. The *Members* alone are eligible for the fellowship. They constitute a portion of the corporation, so far as they have the use of the library and museum, and the privilege of admission to all lectures; but they do not take any share in the government, or attend or vote at meetings. The examiners for the membership are the president and censors. The *Licentiates* are not members of the corporation; they have access to the museum, lectures, and reading-room, but are not allowed to take books away from the library; they may compound and dispense medicines for *patients under their own care;* and in their qualifications very much resemble those who have diplomas both from the College of Surgeons and the Apothecaries' Hall. They must be 21 years of age, and must have been engaged in professional studies for four years before being admitted to examination. The fee for admission as a fellow is 30 guineas, exclusive of stamp-duty; the member's fee is also 30 guineas, and the licentiate's 15 guineas.

The following are among by-laws of the college: 1. No fellow of the college is entitled to sue for professional aid rendered by him. This by-law does not extend to members. 2. No fellow, member, or licentiate of the college is entitled to assume the title of doctor of medicine unless he be a graduate in medicine of a university. 3. No fellow or member of the college shall officiously, or under color of a benevolent purpose, offer medical aid to, or prescribe for, any patient whom he knows to be under the care of another legally qualified medical practitioner.

PHYSI′CIANS OF EDINBURGH, THE ROYAL COLLEGE OF: established 1617, in an attempt to incorporate the practitioners of medicine, and raise the standard of the profession. King James I. of England granted an order for its establishment; Cromwell in like manner issued a patent in its favor; but both were frustrated by the religious dissensions of the times, and it was not until 1681 that the body became incorporated under a charter from Charles II. A new charter with many important provisions was issued in 1861. There is a library of more than 15,000 vols.; also a valuable and interesting museum of materia medica.

PHYSICK, *fiz′ik*, PHILIP SYNG, M.D.: surgeon: 1768, July 7—1837, Dec. 15; b. Philadelphia; son of Edmund P., who was agent of the Penn family. He graduated from the Univ. of Pennsylvania 1785, studied medicine in this country and under John Hunter in London, and was appointed a house-surgeon in a London hospital 1790, and the following year the Royal College of Surgeons issued his license. He graduated from the Univ. of Edinburgh 1792, commenced practice in Philadelphia 1793, and rendered brilliant service in the hospitals in the yellow fever epidemics of that decade. By post-mortem examinations, he made valuable discoveries regarding the nature of this disease. He commenced lecturing on surgery at the Univ. of Pennsylvania 1800, was prof. of surgery in that institution 1805–19, and of anatomy 1819–31. He is said to have been the first American honored with membership in the French Acad. of Medicine. He invented valuable instruments, devised improved methods, and was one of the most brilliant operators of his time. He died in Philadelphia.

PHYS′IC NUT (*Curcas*): genus of plants of nat. order *Euphorbiaceæ*, having a 5-partite calyx, 5 petals, and 8–10 unequal-united stamens. The species are not numerous. They are tropical shrubs or trees, having alternate, stalked, angled or lobed leaves, and corymbs of flowers on long stalks; and notable for the acrid oil of their seeds. The COMMON P. N. of the E. Indies (*C. purgans*), now common in the W. Indies also, and other warm parts of the world, is a small tree or bush, with milky juice. It is used for fences in many tropical countries, and serves the purpose well, being much branched and of rapid growth. The seeds, though not unpleasant to the taste, abound in a very acrid fixed oil, which makes them powerfully emetic and purgative, or in large doses poisonous. The expressed oil, called

Jatropha Oil, is used in medicine like Croton oil, though less powerful; it is used also in lamps.—The FRENCH P. N., or SPANISH P. N. (*C. multifidus*), shrub, native of tropical America, with many-lobed leaves, yields a purgative acrid oil, called *Oil of Pinhoen.* To this genus belongs the PINONCILLO (*C. lobatus*) of Peru, whose seed is eaten when roasted, and has an agreeable flavor; though when raw it is a violent purgative. When an incision is made in the stem of this tree, a clear bright liquid flows out, which after some time becomes black and horny. It is a very powerful caustic, and retains this property for years.

PHYSICS, *fĭz′ĭks* [Gr. *phusikos*, natural]: term employed by Aristotle, and until recently, for all that pertains to nature; now restricted to the sciences that deal with the forces of nature, exclusive of vital and mental: the phenomena and laws of the inorganic, studied experimentally, but considered for the most part abstractly and mathematically. The late Prof. J. Clerk-Maxwell divided P. into: I. FUNDAMENTAL SCIENCE OF DYNAMICS, including: (1) *Kinematics*, the kinds of motion of which a body or system of bodies is capable; (2) *Statics*, the equilibrium of forces; (3) *Kinetics*, the relations between the motions of bodies and the forces acting on them; (4) *Energetics*, conditions of action with transference of energy from one body to another: and all this subject has the following relations to the nature of the body: *a*, the dynamics of a particle; *b*, that of a connected system, which may be considered as rigid or as fluid, including possible motion, conditions of equilibrium (hydrostatics), the action of the force in producing motion (hydrodynamics), the force called into play by change of volume; also the dynamics of an elastic body, and of a viscous. II. THE SECONDARY SCIENCES OF PHYSICS: (1) *Theory of Gravitation;* (2) *Theory of the Action of Pressure and Heat* in changing dimensions, this including, *a*, physical states (gaseous, liquid, and solid); *b*, effects of heat on temperature, size, form, and physical states; *c*, thermometry; *d*, calorimetry; *e*, thermodynamics (convertibility of heat and work); *f*, dissipation of energy; *g*, propagation of sound, vibration; (3) *Theory of Radiance*, including, *a*, geometrical optics; *b*, velocity of light in different media; *c*, prismatic analysis and fluorescence; *d*, wave-lengths and wave-periods; *e*, polarized light, etc.; *f*, quantity of energy in total radiance; *g*, the three primary colors; (4) *Electricity and Magnetism: a*, electro-statics; *b*, electro-kinematics; *c*, induction, diamagnetism; *d*, electro-magnetism; *e*, electro-kinetics. Under *b* comes electro-chemistry, terrestrial magnetism, etc. Chemistry is a physical science, but extends beyond dynamics.

PHYSIOCRAT, *fiz'ĭ-ō-krăt* [Gr. *phusis*, nature; *kratos*, force]: in political economy, one who accepted the principles and maxims laid down by Quesnay (q.v.) and other thinkers and practical men, who, about the middle of the 18th c., constituted the school of the *économistes*, as they called themselves, or *physiocrates*, as they were afterward called by one of their own number. PHYS'IOCRAT'IC, a. *-ĭk*, pertaining to the physiocrats or their doctrines. PHYS'IOC'RACY, n. *-ra-sĭ*, the sum of the economic tenets held by the physiocrats.—The term *Physiocrat* was designed to declare that economic relations must stand on a basis of natural right, not on custom, traditional usage, ancient institution, or any system of positive law. All men, the physiocrats held, have the same natural rights. Society is a state of contract between individuals, and its object is the limitation of the natural freedom of each, so far as the assertion of the rights of the others requires. Government must be restricted to securing this end. Labor should be undisturbed and unfettered, and its fruits guaranteed to the possessor; in other words, property should be sacred. Each citizen should be allowed to make the most of his labor; therefore freedom of exchange should be insured, and competition in the market should be unrestricted, no monopolies or privileges being permitted to exist. The physiocrats held only those labors truly 'productive' which add to the quantity of raw materials: the real annual addition to the wealth of a community consists, according to them, of the excess of the products of agriculture, mining, etc., over the cost of production. The manufacturer simply gives new form to these products, and the higher value of the object after it has passed through his hands represents only the quantity of provisions and other materials used in its elaboration. Commerce simply transfers wealth already existing from hand to hand; the gains of the commercial class are made at the cost of the nation, and should be as small as possible. Manufacturers, merchants, professional men, and all individuals rendering personal service, are 'useful,' but their work is 'sterile;' they live on the superfluous earnings of agriculture and the 'productive' occupations. Unrestricted freedom of trade tends, through competition, to reduce as far as possible the income of the mercantile and manufacturing class; therefore *Laissez faire*, or 'Hands off,' should be the motto of government. The revenue of the state must be derived altogether from the net product—the excess of agricultural and mining production; and the revenue ought to be raised in the most direct way—namely, by a single tax on land. The principal aim of the physiocrats was to discredit the policy of the European governments of that time in their dealings with industry: in that respect their efforts were successful; for at that time governmental action had invaded every detail of business, every process of manufacture, every transaction of trade; it was the reign of unqualified protection and rampant monopoly. But it came to be seen later after trial, that *laissez faire* is not less mischievous than excessive governmental interference, and that individualism is not the all-sufficient remedy of social ills. For the physiocrats, government was only a necessary evil: the tendency of modern legislation all over the civilized world, as evidenced by land laws, sanitary enactments, public-school systems, interstate commerce regulation, etc., is to regard government as an indispensable good.

PHYSIOGENY, n. *fĭz-ĭ-ŏj′ėn-ĭ* [Gr. *phusis*, nature; *genos*, race]: in *biol.*, the germ-history of the development of vital activities in the individual.

PHYSIOGNOMY, n. *fĭz′ĭ-ŏg′nō-mĭ*—see *Note* [Gr. *phusis*, nature; *gnōmōn*, one who knows, *gnōmē*, opinion]: the particular cast or expression of the face; the art of determining the character and disposition of a person by an examination of the features of the face: in *botany*, the general appearance of a plant without any reference to its botanical characters. Phys′iog′nomist, n. *-mĭst*, one who is skilled in physiognomy. Phys′iognom′ic, a. *-nŏm′ĭk*, or Phys′iognom′ical, a. *-ĭ-kăl*, pertaining to. Phys′iognom′ically, ad. *-lĭ*. Phys′iognom′ics, n. plu. *-ĭks*, the signs or features of the face which indicate the disposition and character of the mind, and the state of the body; the same as physiognomy. *Note.—Physiognomy* is now generally pronounced *fĭz′ĭ-ŏn′ŏ-mĭ*, which would, as far as pronunciation is concerned, make it appear as derived from Gr. *phusis*, nature; *nomos*, law—whereas the root-words are Gr. *phusis*, and *gnōmōn*, one who knows. In the Gr. word *phusiognō′mia* the judging of the character by the countenance, the *g* or γ is sounded, and it ought to be sounded in the Eng. derivative.

PHYSIOG′NOMY: art of judging of the character from the external appearance, especially from the countenance. The art is founded upon the belief, long and generally prevalent, that there is intimate connection between the features and expression of the face and the qualities and habits of the mind; and every man is conscious of instinctively drawing conclusions in this way for himself with more or less confidence, and of acting on them to a certain extent in the affairs of life. Yet the attempt to reach this conclusion by application of certain rules, and thus to raise the art of reading the human countenance to the dignity of a science, though often made, has never yet been very successful. Comparisons have been instituted for this purpose between the physiognomies of human beings and of species of animals noted for peculiar qualities, e.g., the wolf, the fox, etc. This was begun by Della Porta, a Neapolitan (d. 1615), and was carried further by Tischbein. The subject of P. was eagerly prosecuted by Thomas Campanella; and later and more thoroughly by Lavater (q.v.).—Practical physiognomy, or the reading of individual character, has some generally acknowledged rules; but is likely to fail in many instances when carried into detail, because of the many counterbalancing and varying elements involved. A strong nose may in itself be indicative of strong qualities, but be neutralized by a week jaw or other facial or cranial peculiarities. And the factors not yet understood are too many to render an estimate infallible, even granting that physical conformation is in all points correspondent with character. Still, there are—with the individual exceptions always occurring—some features that go with certain traits. A manifestly fine organization, including contour, skin, and hair, tells its own story; as does the coarse. So does a well-developed head, though some eminent men have small heads. A projecting brow goes with strong perceptions, usually. Fulness of eye, and of the outer upper lid, and of the space below the eye, has marked many persons of large intelligence and power of expression. An upraised full lower lid and full lips are sensuous. Smiling eyes may either indicate humor or be associated with cunning. A straight and not clumsy nose shows æsthetic tendency; a flat or a pug nose, or formless, accompanies low grade; an aquiline and hooked nose may be mephistophelian; a *retroussé* nose gives the impression of pertness. Coarse lips, without the curves of beauty, go with appetite; thin, compressed lips indicate a cold, secretive, calculating nature. A small or retreating chin generally belongs to a negative character; a full chin, especially if vertically divided, is sensuous; a full chin with a large square lower jaw is an index of strong will. The shape of the ears, and the color of eyes and hair, have been debated; in general, the dark are of quicker, stronger temperament; but gray eyes have very often accompanied ability and genius. Books on practical P. are more or less conflicting and overpositive in details. To diagnose a thief or criminal by feature is impossible; the criminal class, to a considerable extent, simply have animal or low-grade features. Some of the ablest workers for good have the visible points of a pugilist. *Character* depends chiefly on *ruling purpose.* As regards characteristics, we look most to fleeting expression and personal bearing, and trust most in intuition and indefinable impression.—The first truly scientific works on the anatomy of expression were by Sir Charles Bell (q.v.). Darwin's *Expression of the Emotions* (1872) treats especially of the physiology and utility of expression in animals and men, with reference to his theories.

PHYSIOGRAPHY, n. *fĭz′ĭ-ŏg′ră-fĭ* [Gr. *phusis*, nature; *graphō*, I write]: term formerly applied to a branch of mineralogy; adopted by Prof. Huxley as a convenient name for an exposition of the principles that underlie physical geography, and including the elements of physical science. P. is thus understood to involve a compendious discussion of gravitation, heat, the composition of the crust of the earth, the movements of the sea, the phenomena of the atmosphere, and many cognate subjects, treated in this work under separate heads. **Phys′iograph′ical**, a. -ō-*grăf′ĭ-kăl*, pertaining to physiography. **Phys′iograph′ically**, ad. -*lĭ*.

PHYSIOLATRY, n. *fĭz-ĭ-ŏl′a-trĭ* [Gr. *phusis*, nature; *latreia*, worship]: nature-worship; the cult of the powers of nature.

PHYSIOLOGUS, *fĭz-ĭ-ŏl′ō-gŭs* [Gr. *phusis*, nature; *logos*, discourse]: one of the names given to a collection of about 50 Christian allegories, with imagery mostly from the animal world; much read in the middle ages: bestiary: see BESTIAIRES. Fragments or complete copies of the P. are extant in Greek, Syriac, Armenian, Ethiopic, Arabic, Latin (in several different forms, one giving the collection complete, another in abridgment, a third in a metrical version), old Eng. (metrical), old French (metrical), old High Ger. (in prose and in verse), Icelandic, Anglo-Saxon, Provençal.

PHYSIOLOGY, n. *fĭz′ĭ-ŏl′ŏ-jĭ* [Gr. *phusiologia*, an inquiry into the nature and origin of things—from *phusis*, nature; *logos*, discourse: F. *physiologie*]: science which treats of the vital actions or functions performed by the organs of plants and animals. PHYS′IOL′OGIST, n. *-jĭst*, one who studies or treats of physiology. PHYS′IOLOG′IC, a. *-ō-lŏj′ĭk*, or PHYS′IOLOG′ICAL, a. *-ĭ-kăl*, pertaining to physiology; relating to the science of the properties and functions of living beings. PHYS′IOLOG′ICALLY, ad. *-lĭ*. PHYSIOL′OGIZE, v. *-ŏ-jīz*, to speculate in physiology. —*Physiology*, as the science which treats of the phenomena which normally present themselves in living beings, of the laws or principles to which they are subject, and of the causes to which they are attributable, is a branch of Biology, the science which investigates the nature and relations of living bodies. As dealing with *functions*, P. is distinguished from morphology, the branch of biology which takes cognizance of the structure of the parts or organs. According as it has to do with one or other of the two great groups of organic beings, Physiology is *Animal Physiology* or *Vegetable Physiology*. *General Physiology* includes the structure and chemical composition of bodies, though anatomy and histology precede Physiology in the order of the sciences. *Comparative Physiology* deals with the resemblances and diversities between the vital actions of various groups and species. *Special Physiology* treats of the vital phenomena of particular species, *Human Physiology* being restricted to the human subject. The functions expounded by P. are usually regarded as under three main heads: (1) Nutrition; (2) Innervation; and (3) Reproduction. For the principles of *Vegetable Physiology*, see that title: for the various portions of *Animal Physiology*, especially human, with the anatomy of the organs concerned, see such titles as DIGESTION: CIRCULATION: RESPIRATION: NUTRITION: BRAIN: NERVOUS SYSTEM: SPINAL CORD: AUDITORY NERVE: EAR: NOSE, ETC.: REPRODUCTION: and many others.

PHYSIOPHILY, n. *fĭz-ĭ-ŏf′ĭ-lĭ* [Gr. *phusis*, nature; *philos*, loving]: in *biol.*, the tribal history of the functions. In the case of man, a large part of the history of culture falls under this head.

PHYSIQUE, n. *fĭ-zēk′* [F. *physique*, appearance of the body—from Gr. *phusĭkos*, natural]: the natural constitution or physical structure of a person as it appears to the eye.

PHYSNOMY, or PHISNOMY, n. *fĭz′nō-mĭ:* in *OE.*, a corrupted spelling of *physiognomy.*

PHYSOGRADE, a. *fĭz′ō-grād* [Gr. *phusa*, an air-bladder; L. *grădi*, to walk]: moving in the water by air-bladders—applied to a tribe of sea-nettles.

PHYSOMETRA, n. *fĭz′ō-mē′tră* [Gr. *phūsaō*, I inflate or distend; *mētra*, a womb—from *mētēr*, a mother]: an accumulation of air in the uterus which causes an enlargement of the abdomen.

PHYSOMYCETES, n. *fĭz′ō-mī-sē′tēz* [Gr. *phusa*, a bladder; *mukēs* or *mukēta*, a fungus]: a division of the Fungi in which the thallus is floccose, and spores are surrounded by a vesicular veil or sporangium, as in bread-mold.

PHYSOPHORIDÆ, n. plu. *fĭz′ō-fŏr′ĭ-dē* [Gr. *phusa*, an air-bladder; *phorĕō*, I bear]: an order of oceanic Hydrozoa.

PHYSOSTIGMA, n. *fĭz′ō-stĭg′ma* [Gr. *phusa*, bellows, and *stigma:* name betokening the bladder-like apex of the style]: Calabar Bean (q.v.). PHYS′OSTIG′MINE, n. *-mĭn* or *-mēn*, alkaloid principle of the Calabar bean: it is highly poisonous, but is devoid of taste.

PHYTELEPHAS, n. *fī-tĕl′ĕ-făs* [Gr. *phuton*, a plant; *elĕphas*, an elephant, ivory]: genus of S. Amer. palms whose nuts contain a substance like ivory, and known by the name vegetable ivory—known also by the name *Jagua plant;* ord. *Palmœ:* see IVORY, VEGETABLE.

PHYTIVOROUS, a. *fī-tĭv′ō-rŭs* [Gr. *phuton*, a plant; L. *voro*, I eat]: applied to animals that subsist on plants; herbivorous.

PHYTOCHLOR, n. *fī′tō-klōr* [Gr. *phuton*, a plant; *chlōros*, green]: the green coloring matter of plants; chlorophyl.

PHYTODERMA, n. *fī′tō-dėr′mă* [Gr. *phuton*, a plant; *derma*, skin]: any fungus or vegetable parasite growing on the skin. PHYTODERMATA, n. plu. *-dėr′mă-tă*, skin diseases caused by fungi.

PHYTOGENY, n. *fī-tŏj′ĕ-nĭ*, or PHYTOGENESIS, n. *fī′tō-jĕn′ĕ-sĭs* [Gr. *phuton*, a plant; *gennaō*, I produce]: in *bot.*, the doctrine of the generation or production of plants; the development of the plant.

PHYTOGEOGRAPHY, n. *fī′tō-jē-ŏg′ră-fĭ* [Gr. *phuton*, a plant, and Eng. *geography*]: the study of the laws regulating the distribution of plants, and of different plant regions.

PHYTOGRAPHY, n. *fī-tŏg′ră-fĭ* [Gr. *phuton*, a plant; *graphō*, I write]: the scientific description of plants, treating of their character, habits, distribution, functions, and properties; descriptive botany. PHY′TOGRAPH′ICAL, a. *-tō-grăf′ĭ-kăl*, pertaining to phytography.

PHYTOID, a. *fī′toyd*, or PHYTOIDAL, a. *fī-toy′dăl* [Gr. *phuton*, a plant; *eidos*, appearance]: resembling plants; plant-like.

PHYTOLACCA, *fī-tō-lăk′kâ:* genus of exogenous plants, of nat. order *Phytolaccaceæ.* This order contains about 70 known species, half-shrubby and herbaceous plants, natives of warm parts of Asia, Africa, and America. It is nearly allied to the order *Chenopodiaceæ*, and to the *Polygoneæ.* The genus *Phytolacca* has for its fruit a berry with 8–10 cells, each cell one-seeded. *P. decandra*, the Poke, Poke-weed, or Pocan, native of N. America, now naturalized in parts of s. Europe, is sometimes cultivated for its young shoots, which, when blanched, are eaten like asparagus, though the leaves are acrid: the root is an emetic, and is applied externally for itch and ringworm; and a preparation of the berries is used in rheumatism and syphilis, and for adulteration of wine. The Poke-weed is a characteristic Amer. plant: other names for it are Inkberry-weed, Garget, Redweed, Red-ink-plant, Foxglove, Pigeon-berry, Scoke, etc.—The young shoots of *P. acinosa* are boiled and eaten in the Himalayas, those of *P. octandra* in Cayenne, and a Chinese species has recently been introduced into some western countries under the name *P. esculenta.*

PHYTOLITE, n. *fī′tō-līt* [Gr. *phuton*, a plant; *lithos*, a stone]: in *geol.*, a general term for a fossil plant.

PHYTOLOGY, n. *fī-tŏl′ŏ-jĭ* [Gr. *phuton*, a plant; *logos*, discourse]: name sometimes used for *Botany*, the science of the vegetable kingdom; the scientific study of plants. PHYTOLOGICAL, a. *fī′tō-lŏj′ĭ-kăl*, pertaining to phytology. PHYTOL′OGIST, n. *-tŏl′ŏ-jĭst*, a scientific botanist.

PHYTON, n. *fī′tŏn* [Gr. *phuton*, a plant]: in *bot.*, a name sometimes given to the simple individual plant as represented by a leaf.

PHYTONOMY, n. *fī-tŏn′ō-mĭ* [Gr. *phuton*, a plant; *nomos*, a law]: the science of the origin, growth, and arrangement of plants.

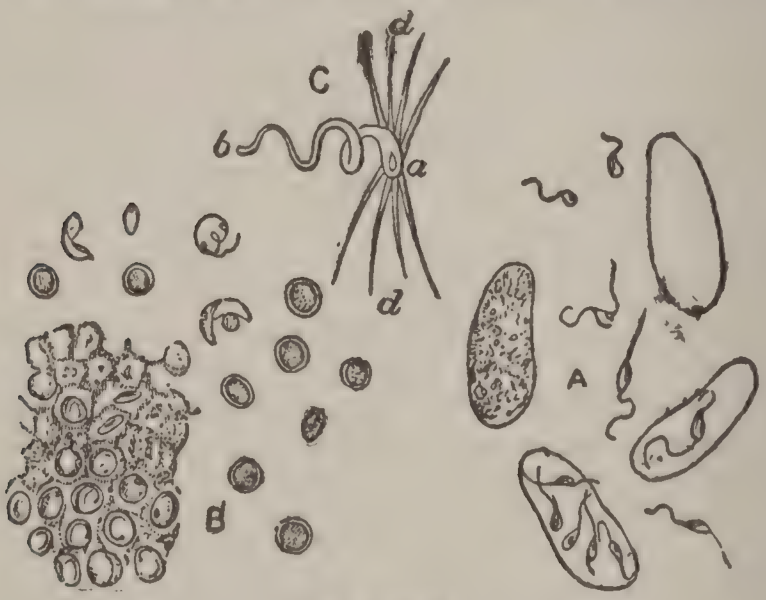
PHYTOPATHOLOGY, n. *fī-tō-pa-thŏl′o-jĭ* [Gr. *phuton*, a plant; Eng. *pathology*]: science of the knowledge of the diseases of plants.

PHYTOPHAGOUS, a. *fī-tŏf′ă-gŭs* [Gr. *phuton*, a plant; *phagein*, to eat]: plant-eating, applied to animals that live on vegetable substances; herbivorous; the same as *phytivorous.*

PHYTOTOMY, n. *fī-tŏt′ō-mĭ* [Gr. *phuton*, a plant; *tomē*, a cutting]: the dissection of vegetable organized bodies. PHYTOT′OMIST, n. *-mĭst*, one who is skilled in phytotomy.

PHYTOZOIDS, n. plu. *fī′tō-zō′ĭdz* [Gr. *phuton*, a plant; *zōŏn*, an animal; *eidos*, resemblance]: in *bot.*, the male reproductive elements in the cellules of the antheridia in cryptogams, which exhibit active movements at certain periods of their existence, and thus resemble animalcules; spermatozoids or antherozoids.

PHYTOZOON, n. *fī'tō zō ŏn* [Gr. *phuton*, a plant; *zōŏn*, an animal]: a plant-like animalcule, or one living in the tissues of plants: plu. PHY'TOZO'A, *-zō'ă*, or PHY'TOZO'ONS, *-zō'ŏnz*, or ANTHEROZOIDS, in *bot.*, moving filaments in the antheridia of cryptogams; the male reproductive elements, minute bodies, are produced amidst a mucilaginous fluid in the antheridia of many cryptogamous plants (Algæ, Hepaticæ, Mosses, Ferns), which are either aquatic or thrive in moist situations. In some many-celled antheridia of the higher cryptogamous plants, each cell is devoted to the production of a single phytozoon. When the antheridium is mature, and bursts, the phytozoa move for a short time by means of cilia—a provision, apparently, for their reaching the pistillidia. Great diversities exist in the phytozoa of different cryptogamous plants. Cryptogamous plants, which, as lichens, live in dry situations, have no phytozoa, though it is supposed that they have organs destined to the same purpose, but destitute of the power of motion by cilia.



Phytozoa:

(From Carpenter on the *Microscope*.)

A. Antherozoids of *Fucus platycarpus* (a sea-weed), some of them free others still included in their antheridiol cells.

B. Cellular contents of an antheridium or *Polytrichum communi* (a moss), mature and discharging the antherozoids.

C. Antherozoid of *Pteris serrulata* (a fern), showing *a*, its large extremity; *b*, its small extremity; *d*, *d*, its cilia.

PI, n. *pī:* in *print.*, mixed, disarranged type: V. to mix type: see PIE 2.

PIACENZA, *pē-â-chĕn'zâ:* city of n. Italy, province of P.; on the right bank of the Po, 2 m. below the confluence of the Trebbia with that river, 43 m. s.e. of Milan, 36 m. w.n.w. of Parma. Beautifully situated, 217 ft. above sea-level, on a fine plain, confined on the s. by well-cultivated hills, the city itself is gloomy and desolate in appearance. Its streets are broad and regular—that called the *Stradone* is one of the most beautiful in Italy—but many of them are unfrequented and grass-grown. It contains numerous palaces, and about 50 churches. The cathedral, in the ancient Lombard style, founded in the 11th c., is famous for its richly-curious and grotesque internal decorations, for its numerous sculptures, its paintings; and for a number of frescoes of great grandeur, by Caraccio, Guercino, and others. The Church of Sant' Antonio, the original cathedral of P., was founded 324, but has been several times rebuilt. The Palazzo Farnese, founded 1558, formerly a sumptuous edifice, which has been long in use as a barrack; the Palazzo del Commune, and the Collegio dei Mercanti are fine monuments of art. The principal square is the Piazza Cavalli, named from the colossal bronze equestrian statues of the dukes Alessandro and Rannuccio Farnese. This town occupies an important military position—a fact appreciated by those who fortified it with solid walls and a strong castle, which, till 1859, were guarded by the Austrians. On being forced from the city by the war of 1859, the Austrians did not destroy the works, and the Italian govt. has strengthened and extended them by externally defended works, and a formidable intrenched camp, which unites and protects the other works on the right bank of the Po. There are manufactures of silks, fustians, linens, hats, etc. Pop. (1881) 34,925; having been almost stationary during the previous ten years; (1901) 36,064.

P., called by the Romans *Placentia*, on account of its pleasing situation, is mentioned first B.C. 219, when a Roman colony was settled there. B.C. 200 it was plundered and burned by the Gauls; but rapidly recovered its prosperity, and was long an important military station. P. was the w. terminus of the great Æmilian road, which began at Ariminum on the Adriatic. In later history, it was important as one of the independent Lombard cities.

PIACULAR, a. *pī-ăk′ū-lėr* [L. *piac′ulum*, a sin-offering; *pio*, I appease—from *pius*, devout]: having power to atone; expiatory; that requires expiation.

PIA MATER, n. *pī′ă mā′tėr* [L., kind mother]: a delicate, fibrous, and highly vascular membrane, which immediately invests the brain and spinal cord—the *dura-mater* being the outer membrane. See NERVOUS SYSTEM.

PIANA DE' GRECI, *pē-â′nâ dā′ grā′chē:* town of Sicily, 10 m. s.w. of Palermo. It was the chief colony of the Albanians who settled in Sicily in the 15th c. Pop. 9,500.

PIANO, ad. *pĭ-â′nō* [It. *piano*, softly, low—from *piano*, even, smooth—from L. *plānus*, even, smooth]: in *music*, indication that the strain where it occurs is to be played or sung with less than the average force: its abbreviation is *p;* and *pp*, or *ppp*, for *pianissimo*, signifies very soft, or as soft as possible. On the other hand *forte*, abbreviated *f*, denotes a more than usual force; and *ff*, *fff*, for *fortissimo*, a still greater degree of force. The gradual transition from *piano* to *forte* is indicated by the sign <; from *forte* to *piano* by the sign >. **PIANO**, n. *pĭ-ăn′nō*, a keyed musical instrument (see PIANOFORTE). **PIANISSIMO**, ad. *pĭ-â-nĭs′sĭ-mō*, very softly. **PIANIST**, n. *pĭ-ăn′ĭst*, a performer on the pianoforte. **PIAN′OGRAPH**, n. *-grăf*, in *mus.*, machine which, on being attached to a pianoforte, inscribes what is played.

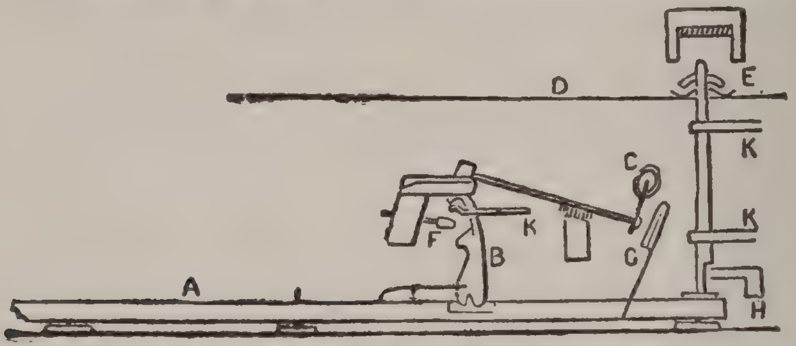
PIANO-FORTE, *pĭ-ăn′ō-fōr′tā*, contracted into *Piano* [It. *piano*, soft; *forte*, strong—from L. *fortis*, strong]: stringed musical instrument, played by keys, developed out of the clavichord and Harpsichord (q.v.), from which the P. differs principally in the introduction of hammers, to put the strings in vibration, connected with the keys by a mechanism that enables the player to modify at will the intensity of the sounds; whence the name of the instrument.

The idea of the P. was conceived independently about the same time by three persons in different parts of Europe—Schröter, German organist; Marius, French harpsichord-maker; and Bartolomeo Cristofali, harpsichord-maker of Padua. Priority of invention (1714) is due to the Italian maker. Schröter's discovery was followed up in Germany by Silbermann of Strasburg. Spät of Ratisbon, Stein of Augsburg, and others. The first P. seen in England was made at Rome by Father Wood, an English monk there. A few German manufacturers and workmen settling in London, gave impetus to the new instrument. The English P. has been brought to its present high state by Broadwood, Stodart, Collard, Wornum, Hopkinson, and others. Erard (see ÉRARD, SEBASTIEN) and Petzold made many improvements in France; Germany has long been famous for its pianos; American makers have now become well known throughout the civilized world. The compass of the early P. was, like that of the harpsichord, 4 to 5 octaves, and has gradually increased to 6¾, or 7 octaves, occasionally more.

Favorite among various forms which the instrument assumes has been that of the grand P., derived from the harpsichord, with the strings placed horizontally parallel to the keys. The strings are stretched across a compound frame of wood and metal, composed of bars, rods, and strengtheners of various kinds—appliances necessary to resist the enormous tension. This framework includes a wooden sound-board. The mechanism by which hammers are connected with the keys, is called the *action* of the instrument. In the earliest pianofortes, the hammer was raised from below by a button attached to an upright wire fixed on the back-end of the key. The impulse given to the hammer caused it to strike the string, after which it immediately fell back on the button, leaving the string free to vibrate. This was called the *single action.* As the hammer, when resting on the button with the key pressed down, was thus necessarily at a little distance from the string, the effectual working of this action required that a certain impetus should be communicated to the hammer to enable it to touch the string. Hence it was impossible to play very *piano,* and it was found that if the hammer was adjusted so as to be too close to the string when resting on the button, it was apt not to leave the string till after the blow had been given, thereby deadening the sound. This defect was remedied by a jointed upright piece called the *hopper,* attached to the back-end of the key, in place of the wire and button. When the key was pressed down, the hopper, engaging in a notch in the lower side of the hammer, lifted it so close to the hammer, that the lightest possible pressure caused it to strike; and at this moment, when the key was still pressed down, the jointed part of the hopper, coming in contact with a fixed button as it rose, escaped from the notch, and let the hammer fall clear away from the string. To prevent the hammer from rebounding on the string, a projection called the *check* was fixed on the end of the key, which caught the edge of the hammer as it fell, and held it firmly enough to prevent it from rising. A necessary part of the action is the *damper,* which limits the duration of each particular note, so as to cause it to cease to sound as soon as the pressure is removed from the key. It consists of a piece of leather resting on the top of the string, and connected with the back-part of the key by a vertical wire. When any key is pressed down, its damper is raised off the string, so as to allow the sound produced to be clear and open; but immediately on the finger being lifted off the key, the damper-wire falls, and the damper again presses on the string, muffling and stopping the vibration. The whole range of dampers may, when required, be raised by the use of the damper-pedal, so as to prolong the sound of one note into another.

One further frequent and important addition to the action may be alluded to. In the mechanism above described, the key must rise to its position of rest before the hopper will again engage in the notch of the hammer for another stroke; hence, a note cannot be repeated until time has been allowed for the full rise of the key. The *repetition action* is a contrivance, varying in different instruments, for riddance of this defect, by holding up the hammer at a certain height while the key is returning.—For mode of producing the notes, see SOUND.

Great difference of detail exists in the actions of different makers. Some are more complicated than others; but in all are found the same essential parts, modified only in shape and arrangement. The subjoined figure represents one of the simplest grand P. actions now in use. A is the key, B the lever which raises the hammer, C the hammer, D the string, and E the damper; F is the button which catches the lever after it has struck the hammer, G the check, H the damper pedal-lifter, I the spring, and K, K, K are rails and sockets.



Formerly, the strings of the P. all were of thin wire; now, the bass-strings are very thick, and coated with a fine coil of copper-wire; and the thickness, strength, and tension of the strings all diminish from the lower to the upper notes. A grand P. has three strings to each of the upper and middle notes, and now, generally, only two to the lower notes, and one to the lowest octave. When the soft pedal is pressed down, the hammers are shifted sideways, so as to strike only two strings instead of three, or one string instead of two.

Besides the grand, the kinds of P. in use are the square, in which the strings are placed still in a horizontal position, but obliquely to the keys; and the upright, in which the strings run vertically from top to bottom of the instrument. The difference in form necessitates alterations in the details of the action, but the general principle is the same. The upright form has been greatly improved and developed in recent years, and has come into increasing favor. The P. as now developed possesses nearly all the powers of expression of any other instrument; on no other except the organ can such complete successions of harmonies be executed; no other represents the orchestra so well, with the advantage that the various parts adapted to it are brought out by the same performer. Its percussive effect has some advantage; but also some disadvantage in its lack of sustained or varied tone after the initial touch; and its temperament is such that without frequent tuning the constant use of the instrument tends to degrade the musical ear. Its popularity, however, is far beyond that of any other musical instrument.

In all large cities of the civilized world are numerous manufacturers of the instrument, employing multitudes of workmen; and in Germany and the United States the manufacture is carried on in many of the secondary towns. Formerly, the German makers adopted a much less perfect action than the English, producing a very different touch and tone; but they are now largely using the English action, which is spreading over the European continent.

The first P. made in America was by Benjamin Crehorn, of Milton, Mass., 1803. In 1820 Jonas Chickering (q.v.) became associated with James Stewart in the manufacture of pianos in Boston. Apparently the business did not meet expectation, for two years later Stewart returned to England, where he became well known in connection with the house of Collard & Collard. This left Chickering master of the field, and he soon entered on the brilliant series of inventions which did so much for the art of piano-making. The first invention was the full iron frame, in a single casting, applied to grand pianos by Jonas Chickering 1837. It is claimed that an iron frame had been applied by Alpheus Babcock, 1825; but this was a partial iron frame, only in part supporting the tensile pull of the strings. Many minor devices for improving the solidity of the instrument were invented and introduced from time to time, and in connection with them a continual advance was made in solidity, and in volume and singing quality of tone, which by 1851 had reached such perfection that the Chickering pianos shown in the London World's Fair excited profound attention. The volume of tone had been greatly increased by the 'circular' scale, invented 1845. This permitted the strings to be more widely separated than had been possible in the methods of stringing previously in use, and rendered it practicable to employ a heavier hammer, and so became the foundation upon which the later invention of over-stringing was based. The business, continued by the sons, has been enlarged until it is now one of the largest in the world.—Chickering constructed also the first upright piano ever made in America; though the first practicable instrument was by another maker.

Steinway & Sons, having spent the first three years of their American life in various piano factories, in order to master the peculiarities of American instruments and American taste, established their own house in New York 1853, and immediately entered on the career which soon brought them to the highest rank of P.-makers of the whole world. Attention was attracted to their improvements first at the fair of the American Institute in the Crystal Palace, New York, 1855, when they were unanimously awarded the first prize, after an unusually severe test by a committee of judges of exceptional competence. The epoch-making incident of this competition was the exhibition of the 'over-strung' scale, now adopted by all P.-makers. In 1859 the first over-strung grand P. was made; in 1862 the first over-strung upright, on the general line of scale since become universal Several improvements invented by Steinway & Sons have never been adopted by other houses, owing to the impossibility of evading their patents. The most important of these are the 'duplex' scale, strengthening the over-tones, the cupola metal frame, strengthening the resistant powers of the instrument, and various devices to affect the sounding-board and improve the responsiveness of tone. In the direction of power, the Steinways have increased the tensile pull of the strings from about 20,000 lbs. to more than 60,000 lbs. By general consent their pianos are regarded as superior in tonal capacity to any others made in the world; and their methods are closely copied by the best builders; and to the progress achieved by this house, starting from the inventions of Chickering, the American P. owes its superiority. Nearly all parts of the instrument have been improved by Steinway and Chickering, except one: the strings still remain wound upon steel tuning pins, which retain their tension solely by friction in a wooden wrest plank. A 'patent stringer' has been invented and applied in the pianofortes of Mason & Hamlin, Boston, consisting of a 'set screw,' acting through a raised rim of the metal frame, whereby it is rendered impossible for the pin to slip, the principle being the same as that of the 'patent head' of the guitar and cello, thus remedying all that part of getting out of tune due to the pins slipping. The tone also appears to be bettered by this device.

In its present form, the art of P.-making appears to have nearly reached the limits possible for metal strings struck by felt hammers. The duration of the vibration, as well as its volume and capacity for color, have been enormously developed by American builders within the past half-century. Improvements in the sounding-board have reached a point where the less favorable overtones of the vibrating wire enter into the clang and color it unfavorably.

Among the firms at the head of the list, next to the two pre-eminent ones above mentioned, are those of Decker Brothers and Wm. Knabe & Co. There are also a large number devoted to production of a practical P. at moderate prices, in which large capital finds quick and remunerative returns. The principal centre of P. manufacture still remains at New York, but the tendency is westward.

Music for the P. is written in two staves, and on the treble and bass cleffs. Many of the most eminent musicians have given their efforts largely to composing for it; and some composers of note, e.g., Hummel, Czerny, Kalkbrenner, Chopin, Thalberg, Liszt, and Heller, have almost confined themselves to that instrument.—See PITCH, in Music. See Rimbault, *The Pianoforte* (1860); and Grove's *Dictionary of Music and Musicians.*

PIARISTS, *pī′a-rĭsts*, familiarly SCOLOPINI, or 'Brethren of the Pious Schools': religious congregation for education of the poor, founded at Rome in the last year of the 16th c.—the Pauline Congregation of the Mother of God. The originator was a Spanish priest, Joseph of Calasanza, who, while in Rome, was struck with the imperfect and insufficient character of the prevalent education, even for children of the higher classes, and conceived the idea of organizing a body to meet this want, which the Jesuit Soc. had already partially supplied. The school which he with a few friends opened, rapidly increased in number to 100, and ultimately to 700 pupils; and 1617, the brethren who, under the direction of Joseph, had associated for the work, were approved as a religious congregation by Paul V. (q.v.), who entered warmly into this and other projects of reformation. In 1621 Gregory XV. approved the congregation as a religious order. The constitution of the order was several times modified by successive popes, till the time of Innocent XI. Its field of operations has been confined to European countries; and at present it has communities in Italy, Austria, Spain, Hungary, and Poland. In Italy, during the revolutionary wars, the P. received into their ranks many members of the suppressed Soc. of the Jesuits. In Spain, their establishments were spared, on the general suppression of religious orders 1836. In Poland, 11 houses still were in existence 1832. The number of members in Hungary is said to be about 400, and the order is found also in German and Slavonic parts of the Austro-Hungarian empire.

PIASSABA: see PIASSAVA.

PIASSAVA, *pĭ-ăs′a-vâ*, or PIAS′SABA, or PIAC′ABA [Brazilian name]: remarkable vegetable fibre which, in recent years, has become important. It is procured from Brazil, chiefly through the ports of Para and Maranham; and is produced by one or more species of palm. That which furnishes the greater part is the Coquilla-nut Palm (*Attalea funifera*); but Wallace states that much of it is procured from a species of *Leopoldinia*, which he has named *L. piassaba.* The fibre is produced by the stalks of the large fan-like leaves. When the leaves decay, the petioles or stalks split into bundles of cylindrical fibres of dark-brown color, and hard texture, varying in thickness from that of a horse-hair to that of a small crow-quill. This material has been found of great utility in making coarse brushes, particularly those required to sweep the street; for which purpose they have almost superseded birch-brooms, split whale-bone brushes, and similar implements for scavengers. The coarsest fibres are best for such purposes; the finer are valuable for finer brushes.

PIASTER, n., or PIASTRE, n. *pĭ-ăs′tėr* [F. *piastre*—from It. *piastra*, a thin plate of metal, a dollar: Sp. *piastra:* the word by Skeat is said to be a mere variant of *plaster*]: a silver coin used in Turkey, S. America, Italy, and Spain, of variable value; a Turkish coin now valued at about 2¼*d.*

PIASTRE, *pĭ-ăs′tėr* [Gr. and L. *emplastron*, a plaster; transferred in the Romanic languages to anything spread out or flattened, a plate, a coin]: Spanish silver coin, extensively adopted by other nations. It was formerly divided into 8 silver reals; hence was termed a *piece of eight*, which name was invariably applied to it by the buccaneers of the Spanish Main. The present Spanish P.—commonly known as the *peso duro, peso fuerte,* or, briefly, *duro*—is the standard of the money system, and is equivalent to about $1.03⅛ of our money. It is divided into 20 copper reals (*reales de vellon*). In the Levant, the P. is called a *colonnato*, on account of the original coins, struck for use in Spanish America, bearing two columns on the reverse side.—The Italian P., or *scudo*, an evident imitation of the Spanish coin, was exactly equal to it in value.—The P., peso, or dollar in use in Mexico and Cuba, as well as in Chili, Peru, Uruguay, and other S. Amer. states of Spanish origin, have approximately the same value (97⅛ cents, or $1.01⅛). The Dollar (q.v.) of the United States was adopted from the Spanish P., but is a fraction less in value, owing, it is said, to an error in the original estimate.—The coin known as the Turkish P. (Turk. *ghūrūsh*) is not an imitation, but an independent national silver coin, which, 1753 was worth about 3*s*. 6*d*. sterling, but has since gradually and rapidly deteriorated, till at the present day it is equal to about $4\frac{4}{10}$ cents of our money.—The Egyptian P. is worth about $3\frac{1}{16}$ cents. Pieces of 2, 5, 10, and 20 piastres are struck in silver, and of 50 and 100 in gold; the piece of 100 piastres being in Egypt the exchange at par for 1£ sterling, or about $4.86⅔.

PIATIGORSK, *pē-â-tē-gŏrsk′* (*Pjätigorsk*): town in Caucasia, Russia, famed for its mineral springs. Though in the centre of a bare and uninteresting plain, its situation on the slope of Mashùka, an isolated mountain more than 3,000 ft. high, gives it an imposing appearance; and the higher parts of the town command a noble panoramic view of Mt. Elburz and the more distant Caucasus. The principal bath-houses are well sheltered, and are cleanly, and comfortably fitted up. Pop. (1889) 13,114.

PIATRA, *pē-â′trâ:* town of Moldavia, 62 m. w.s.w. from Jassy, on a branch of the Sereth. There are paper-mills here. Pop. (1880) 13,890; (1890) 20,000.

PIATT, *pī′at*, DONN: 1819, June 29—1891, Nov. 12; b. Cincinnati. After a partial course at St. Xavier College, he studied law, became judge of the Hamilton co. court 1851, was sec. of legation at Paris, and for nine months, during the illness of his superior, was *chargé d'affaires*. He served through the civil war, enlisting as a private and reaching the rank of colonel. For several years he was the Washington correspondent of the Cincinnati *Commercial*, and afterward founded the *Capital*, in which he violently assailed several of the highest govt. officials. He published *Memoirs of the Men Who Saved the Union* (1887), and was editor of *Belford's Magazine* 1890.

PI′ATT, John James: poet: b. Milton, Ind., 1835, Mar. 1. He worked in a printing-office, afterward took a partial course at Kenyon College, became a contributor to the Louisville *Journal*, and was govt. clerk at Washington 1861–67. Returning to Cincinnati, he was connected with the newspaper press for three years. He then became enrolling clerk of the national house of representatives, and 1871 was appointed its librarian. He became U. S. consul at Cork, Ireland, 1882, and (1890) retains the office. Among his numerous works are *Poems in Sunshine and Firelight* (1866); *Western Windows* (1869); *Landmarks* (1871); *Poems of House and Home* (1878); *Idyls and Lyrics of the Ohio Valley* (1884); *At the Holy Well* (1887).

PIAZZA, n. *pĭ-ăz′ză* [It. *piazza:* Sp. *plaza*, a market-place—from L. *platĕă;* Gr. *plateia*, a broad street]: a square; a considerable open space surrounded by buildings; a pathway under a roof supported by pillars or arches; in the *United States*, a veranda.

PIAZZA, *pē-ât′sâ* (fully Piaz′za Armeri′na): town of Sicily, 17 m. e.s.e. from Caltanisetta. The chief trade is in corn, oil, fruits, and other agricultural produce. Pop. 17,000.

PIAZZI, *pē-ât′sē*, Giuseppe: astronomer: 1746, July 16—1826, July 22; b. Ponte in the Valteline. He was received into the order of the Theatins at Milan 1764, and studied in that city, and subsequently in the houses of the same order at Rome and Turin. Summoned to the professorial chair of philosophy at Genoa, he so alarmed the Dominicans by the freedom and boldness of his opinions, that he was removed to Malta, where, 1770, he became prof. of mathematics in the newly-founded university. On the breaking up of this seminary, he returned to Italy, and after teaching philosophy in the Nobles' College at Ravenna, he went to Rome, where he became prof. of dogmatic theology in the institution of San Andrea della Valle. He was transferred 1780 to the chair of mathematics in Palermo, where, with the aid of govt., he established an observatory, which was put in working order 1789. The first results of his observations were, the rectification of some errors in the estimation of the obliquity of the ecliptic, the aberration of light, the length of the tropical year, and the parallax of various heavenly bodies: these results were published 1792. P. had then attained a European reputation, which was heightened by his discovery, on the night of 1801, Jan. 1, of a new planet, the first known of a great group of planetoids between Mars and Jupiter. P. was able only to give a description of it to some of the German and Italian astronomers, when it disappeared; Gauss (q.v.), however, rendered certain the fact of its being a planet. P. named it Ceres, after the ancient goddess of Sicily, to which country he was sincerely attached. In 1803 he published a map of the fixed stars, far superior to any before published, the result of ten years' observations: the work was crowned by the Institute of France.

In 1814, appeared a new and more complete catalogue (containing 7,646 stars), for which he was again rewarded with a prize from the French Institute. He also made researches into the nature of comets, and gave his later years to improvement of public education in Sicily. Besides the catalogues of stars above mentioned, the *Lezioni Elementari di Astronomia* (Palermo 1817) is his chief work. He wrote also many memoirs for the various scientific societies of Europe. P. died at Naples.

PIBCORN, n. *pĭb'kawrn* [W. *pib*, a pipe, and *corn*, a horn]: in *Wales*, a musical instrument consisting of a pipe with a horn at each end.

PIBROCH, n. *pē'brŏk* [Gael. *piobaireachd*, pipe-music—from *piob*, a pipe; *piobair*, a piper]: music played on the Bagpipes (q.v.), which has a wonderful power in exciting the martial instincts and hilarity of the Highlanders. Its rhythm is so wild and irregular, and its notes in the quicker parts so much jumbled together, that a stranger has difficulty in following the modulations or reconciling his ear to them. Its air or ground-theme is called the *urlar;* this is followed by three or four variations; and there is a rapid movement in conclusion. The earliest certain mention of the military music of the bagpipe is at the battle of Balrinnes, 1594; indeed, prior to that period, the bagpipe can hardly be deemed a national instrument of Scotland. There are appropriate pibrochs belonging to various clans and districts, but some of these may not be older than the beginning of the 18th c. One of the oldest known pibrochs is called the 'Battle of Harlaw,' but there is doubt whether it was contemporary with that event (1411). In the ballad account of that battle, there is mention of trumpets and horns, but none of the bagpipe; and the P. style of music has so obvious a relation to the bagpipe (the instrument itself being called P. sometimes in poetry) that it is difficult to suppose that it preceded the use of the bagpipe. According to Sir Walter Scott, the connoisseurs in pipe-music affect to discover in a well-composed P. the imitative sounds of march, conflict, flight, pursuit, and all the current of a heady fight. Many remarkable instances have been recorded of the effect of the P. on the Highlanders. At the battle of Quebec, 1760, Apr. 7, while the British troops were retreating in confusion, the pipers were ordered to strike up a favorite P.; and the Highlanders, who were broken, rallied the moment that they heard the music, and formed with alacrity in the rear.

PICA, n. *pī'kă* [L. *pica*, the painted one, a pie-bird (see PIE 2)]: the Magpie (q.v.): in *med.*, a depraved appetite; an appetite to eat and drink unusual things, e.g., coal, earth, etc. (see MORBID APPETITES): a printing-type of a size used formerly in printing the *pie* or *table* for finding the *service*—supposed to be so called from the appearance of the red or party-colored initial and other letters so numerously interspersed among the black-letter (see PIE 2). See PRINTING.

PICADOR, n. *pĭk′ă-dōr′* [Sp., a bull-fighter]: in *Sp.*, the horseman who begins a bull-fight by attacking the bull with a spear.

PICAMAR, n. *pĭk′ă-mâr* [L. *pix*, pitch; *amārus*, bitter]: a thick, oily, colorless liquid; the bitter principle of tar.

PIC′ARDS: see ADAMITES.

PICARDY, *pĭk′ėr-dĭ* (LA PICARDIE, *lâ pē-kâr-dē′*): ancient province in n. France; bounded w. by the English Channel, and e. by Champagne. The name does not occur till the 13th c. The cap. was Amiens. Its territory now forms the dept. of *Somme*, and portions of the depts. of *Aisne* and *Pas-de-Calais.*

PICAROON, n. *pĭk-ă-rôn′* [Sp. *picaron*, a great rogue —from *picar*, to sting: It. *piccaro*, a beggar, rascal: comp. Gael. *picear*, a rogue, a pilferer: also F. *picorée*, marauding]: a rogue; a plunderer; a robber; a pirate: spelled also PICKEROON.

PICAYUNE, n. *pĭk-ā-ūn′* [from the language of the Caribs]: in the *U. S.*, a small silver coin, value about 6¼ cents.

PICCADIL, n. *pĭk′kă-dĭl*, or PIC′CADIL′LY, n. *-dĭl′lĭ* [OF. *piccadille*]: a high broad-peaked collar or ruff worn in the reign of James I. PICCADIL′LY, n. *-dĭl′lĭ*, a street of London, said to have been built originally by a tailor who had made his fortune by selling piccadillies—hence the name.

PICCAGE, n. *pĭk′kāj* [from Eng. *pick* or *pitch*]: money paid at fairs for liberty to break ground for booths.

PICCANINNY, n. *pĭk′kă-nĭn′nĭ* [Sp. *pequeno*, little, small: It. *piccino*]: a negro baby or child.

PICCINI, *pēt-chē′nē* (or PICCINNI, *pēt-chēn′nē*), NICCOLA: musical composer: 1728–1800, May 7; b. Barí, Italy. He studied music under famous masters at the conservatory in Naples, and brought out his first opera, *Le Donne Dispettose*, 1754. This was well received, and was followed 1760 by *La Cecchina, ossia la Buona Figliuolæ*, which had a wonderful success in the large European cities. He went to Paris 1766, and produced *Roland*, and several other operas which were very popular. Unfortunately, the managers of the grand opera induced him to enter into direct competition with Gluck (see GLUCK), and each of the composers brought out an opera entitled *Iphigénie en Tauride.* The opera by Gluck proved far superior to that by P., and after less than 20 performances the latter was withdrawn. Removing to Naples 1789, P. produced several successful works; but political troubles and musical rivalries caused him much unhappiness. He spent some time in Venice and Rome, and again went to Paris, where he was enthusiastically received, but was allowed to remain in poverty. Just before his death he was appointed inspector at the national conservatory of music. In less than 22 years he composed many church tunes and more than 130 operas.

PICCOLO, n. *pĭk′kō-lō* [It. little, small]: flute of small dimensions, having the same compass as the ordinary flute, while the notes all sound an octave higher than their notation. In joyous as well as violent passages, this instrument is sometimes very effective in an orchestra.—The name is given also to a small pianoforte; and to an organ-stop of the same musical quality.

PICCOLOMINI, *pĭk-kō-lō′mē-nē*, OTTAVIO: first Duke of Amalfi, Prince of the Empire: 1599–1656, Aug. 11; fifth in direct descent from Pope Pius II. His family, one of the oldest and most distinguished families of Italy, was originally settled at Rome, afterward removed to Siena, and subsequently obtained possession of the duchy of Amalfi: it has produced numerous celebrated *littérateurs* and warriors, one pope (PIUS II.), and several cardinals. He early entered the Spanish military service, and after taking part in the Milanese campaigns, was sent as capt. with a Florentine cavalry regt. to aid Ferdinand II. against the Bohemians. As a cavalry leader, he distinguished himself; and from the regt. of cuirassiers under his command issued the death-dealing bullet to Gustavus Adolphus. In 1634 he was placed under the orders of Wallenstein, who took great liking to him, and confided to him his secret designs against the emperor: P., however, communicated these designs to the emperor, and received, as a reward for his fidelity, a part of Wallenstein's estate. During the remainder of this year, he was actually engaged against the Swedes, and greatly distinguished himself in the first battle of Nordlingen. In the following season he was sent with 20,000 troops to aid the Spaniards in the Netherlands, where the French and Dutch were carrying all before them. P. speedily drove out the French, but his success against the Dutch was not so marked. He was withdrawn by the emperor 1640 to stay the Swedes, who, under Baner, were threatening the hereditary possessions of Austria; and his success against these invaders in Bohemia and the Palatinate, though damped by the defeat inflicted on him in Silesia by Torstensohn, induced the king of Spain to entreat the emperor to send him again to the Netherlands to take the command of the Spanish troops. But his success was not nearly so decisive as before, the prestige of the Spanish infantry having been completely destroyed by the great Condé at Rocroi (1643, May 19). P., however, was again successful against both the French and Dutch till 1648, when he was anew summoned to Germany to encounter the victorious Swedes; but after a brief campaign, the peace of Westphalia (1648) ended his military career. He was created a field-marshal by the emperor, and was sent as plenipotentiary to the Congress of Nuremberg (1649), and soon afterward was raised to the dignity of a prince of the empire. The king of Spain conferred on him the order of the Golden Fleece, and bestowed on him in fief the duchy of Amalfi, which had previously belonged to his family. P. died at Vienna, leaving no children; his son Max, who figures in Schiller's *Wallenstein*, is only a poetical fiction. His fame as a warrior and general is tarnished by his cruel treatment of a number of Hessian and Luneburger prisoners 1640.

PICHEGRU, *pēsh-grü′*, CHARLES: French general: 1761, Feb. 16—1804, Apr. 15; b. Arbois, dept. of Jura, France. Though of humble parentage, he succeeded in gaining admission to the college of his native town, where, and subsequently at Brienne, he received a thorough education. He was distinguished specially in mathematics, and had some thoughts of teaching as a profession; but the advice of Father Perault induced him to enter an artillery regt. 1783, and he had risen to the rank of a lieut. when the Revolution broke out. P. became an ardent democrat; joined the army of the Rhine, and by his brilliant soldierly qualities soon attracted general attention. In 1793 he became commander-in-chief of the army, and in conjunction with the army of the Moselle under Hoche, repeatedly defeated the Austrians, took from them many important towns, Gemersheim, Speyer, Worms, etc., and established himself in the Palatinate. After the arrest of his coadjutor Hoche, his success at the head of the combined Rhine and Moselle armies was not less decided. The rapidity and boldness of his manouvers, when he took command of the army of the north 1794, disconcerted the allies; and soon they were compelled to retreat beyond the Meuse. After brief respite, P. crossed this river, driving the British before him; and by 1795, Feb., had completed the conquest of the Dutch towns and provinces, ending the campaign by capturing the enemy's fleet (which had been frozen in). He then visited Paris, and while there, suppressed an insurrection of the Faubourgs (1795, Apr.1); but soon afterward returned to the army, which was opposed to the Austrians on the w. frontier, and for some time displayed his usual skill and energy, crossing the Rhine in the face of the enemy,and capturing Mannheim, the chief fortress, on its banks. But the anarchy which he had found at Paris, combined with the flattering promises and bribes held out to him by the Prince of Condé, converted P. into a secret partisan of the Bourbons. The bribes are stated at 'a marshal's baton, the governorship of Alsace, the castle of Chambord, 1,000,000 francs in cash, and 200,000 francs a year.' His remissness, and the unwonted folly and awkwardness of his military manouvers, though prearranged with the Austrian generals, were not suspected till he suffered himself to be shamefully defeated at Heidelberg, and then retreated, leaving Jourdan (q.v.) without support, thus compelling the latter also to retire. The suspicions of the directory were aroused, and being confirmed by the seizure of P.'s correspondence, he was immediately superseded by Moreau (q.v.), and retired to his native town, where he lived till 1797, when he was elected one of the Council of Five Hundred. He soon became pres.; but continuing his intrigues with the Bourbons, he was arrested, and subsequently transported to Cayenne. Escaping 1798, June, he made his way to Surinam, whence he sailed for England. He then entered heart and soul into the Bourbon conspiracy with George Cadoudal (q.v.), the two Polignacs, De Rivière, and others, the primary object being the assassination of the first consul. The conspirators secretly reached Paris, and there P. attempted to persuade Moreau, who also was a royalist, to join with them, but without success. But the plans of the conspirators were soon known to the police; and an intimate friend of P., with whom he resided, sold the secret of his retreat to the police for 100,000 crowns. P. was surprised in his sleep, and carried off naked to the Temple, where, a few weeks afterward, he was found, one morning, dead in his bed. The royalists have endeavored to fasten a charge of private assassination on Napoleon; but such a view is untenable, as P. was certain of condemnation and death when brought to trial; and it is generally believed that he strangled himself.

PICHINCHA, *pē-chēn′châ:* extinct or dormant volcano in the w. cordillera of the Andes, in Ecuador, about 10 m. n.w. of Quito. It is of irregular form, 15,924 ft. in height. Around the crater are two other peaks of nearly equal elevation. There have been five eruptions since the Spanish Conquest, the last in 1660. That in 1566 covered Quito with three ft. of ashes and stones. P. was one of the many peaks of the Andes of Ecuador ascended 1879–80 by Edward Whymper.

PICHLER, *pĭch′lėr*, KAROLINE (GREINER): German novelist: 1769–1843; b. Vienna. In 1796 she published her first work, *Gleichnisse* (1800): other books were followed by *Agathokles* (1808), perhaps the best of her novels. Later (1811–32) she turned to the patriotic task of popularizing German history. Among her best works of this kind are *Grafen von Hohenberg* (Leip. 1811); *Die Belagerung Wien's von* 1683 (Wien 1824); *Die Schweden in Prag* (Wien 1827); *Henriette von England* (Wien 1832). Of her social novels, most popular are: *Frauenwürde* (Wien 1808); *Die Nebenbuhler* (Wien 1821); *Zeitbilder* (Wien 1840). She died at Vienna. Her dramas were failures, and in her novels there is some tedious diffuseness. Her collected works were pub. in 60 vols., Vienna 1845.

PICK, n. *pĭk* [Dut. *pikken;* Ger. *picken;* F. *piquer*, to pick, to prick: It. *picco*, a beak: L. *picus*, the woodpecker: W. *pigo*, to pick—all having their origin in the imitation of the sound of the blow of a pointed instrument: Gael. *pioc*, a pinch, a nip]: an iron tool pointed, used in digging; choice; selection: V. to pluck, as fruit; to separate with the fingers; to pull off or clean; to select or choose; to take up; to gather; to eat by morsels, as to *pick* a bone; to pierce; to strike with anything pointed; to open by an instrument, as a lock; to strike with the bill; to rob; to do anything nicely or leisurely. **PICK′-**

ING, imp.: N. the act of plucking, selecting, etc.; a perquisite, usually in the sense of not over-honestly obtained; pounded oyster-shells for gravel-walks; in *OE.*, pilfering; petty stealing. PICKED, pp. *pĭkt:* ADJ. plucked off by the fingers; cleaned by separating with the fingers; opened by an instrument; carefully selected, as *picked* men; in *OE.*, sharp; smart; spruce. PICKED, a. *pĭk'ĕd*, sharp-pointed. PICKER, n. *pĭk'ėr*, one who picks; in *OE.*, a petty pilferer or thief. PICKAX, or PICKAXE [corrupted from OF. *piquois*, by false analogy with ax]: a digging-tool pointed at the one end and broad at the other, used in excavating. PICK-HAMMER, a pointed hammer for dressing granite. PICKLOCK, an instrument by which locks are opened without the key; a person who picks locks; a superior description of wool. PICKPOCKET and PICKPURSE, one who cunningly steals from the pockets of persons in a public place. PICKERS and STEALERS, in *OE. slang*, the hands. PICKTHANK, a flatterer; a tale-bearer; a mean petty informer in order to gain favor. TO PICK OFF, to separate by the fingers; to take away by an unexpected movement, as the life of an enemy in sharp-shooting. TO PICK OUT, to select. TO PICK UP, to gather. TO PICK A BONE WITH ANY ONE, to wrangle; to dispute. TO PICK A HOLE IN ONE'S COAT, to find fault. TO PICK A QUARREL, to get into a quarrel by seeking for it. PICKED OUT, ornamented or relieved with stripes of a different color.

PICK, v. *pĭk:* OE. for PITCH or THROW. PICKER, n. *pĭk'ėr*, the instrument which throws the shuttle.

PICK-A-PACK or -BACK, ad. *pĭk'ă-păk'* or *-băk'* [Eng. *pitch*, and *pack*]: pitched in manner of a pack; pitched on the back—as to carry a child *pick-a-back.*

PICKENS, *pĭk'ĕnz*, ANDREW: 1739, Sep. 19—1817, Aug. 17; b. Paxton, Bucks co., Penn. His ancestors were Huguenots. When 13 years of age he was taken by his parents to S. C. He was a member of the expedition led by Col. Grant against the Cherokees 1761, and on his return made his residence at the Long Cane settlement. He was an ardent patriot and served with great credit through the revolution, entering the army as capt. of militia and reaching the rank of brig.gen. In 1779 he defeated a greatly superior force under Col. Boyd, and 1781, at the battle of Cowpens, he rallied the militia after it had given way. For gallant service in the latter action he was presented by congress with a sword. He served under Gen. Greene in the campaign of Ninety-six, and commanded a brigade at the battle of Eutaw Springs. He obtained a large tract of land from the Cherokee Indians, and about 1782 settled at Hopewell. Soon after peace was restored, he became a member of the legislature of S. C., and by re-elections held this position till 1793, Dec., when he entered congress. He was a member of the convention which adopted the state constitution, was appointed maj.gen. of militia 1795, and on several occasions he was selected to arrange treaties with the Indians of that region. His wife, whom he married 1765, was an aunt of John C. Calhoun. He died in the Pendleton district of S. C., which he had obtained from the Indians by the Hopewell treaty.

PICKEREL, n. *pĭk′ĕr-ĕl* [from PIKE, which see]: a small pike; name of several fish of the pike family: see PIKE.

PICKERING, *pĭk′ér-ĭng*, EDWARD CHARLES: born Boston, 1846, July 19; great-grandson of Col. Timothy P. He graduated from the Scientific School of Harvard College 1865, was prof. of physics at the Massachusetts Institute of Technology 1868–77, and was in the coast survey expedition to Spain to note the eclipse of 1870. He was chosen prof. of astronomy at Harvard Univ. 1876, and also director of the Harvard Observatory. He is a member of various scientific societies, has made many important discoveries, and 1886 received a gold medal from the Royal Astronomical Soc. of London. He has published numerous papers and reports, also *Physical Manipulation*.

PICK′ERING, JOHN, LL.D.: philologist: 1777, Feb. 7—1846, May 5; b. Salem, Mass.; son of Col. Timothy P. He graduated from Harvard College 1796, studied law, was sec. to the U. S. minister to Portugal, and afterward to the minister to Great Britain. He then practiced law about 25 years in Salem, removed to Boston, and was city solicitor 1829–46; served three terms in each house of the Mass. legislature, was a member of the governor's council, and 1833 was one of the commissioners for revising the state laws. He became familiar with many languages and dialects, and was regarded as the principal founder of American comparative philology. He declined professorships in Harvard College, was a member of various learned bodies, and was the first pres. of the American Oriental Soc.; wrote many valuable articles on philology and archeology, and, among other works, published a *Vocabulary of Americanisms*, and a *Greek and English Lexicon* which passed through various editions and was reprinted abroad. He died at Boston.

PICK′ERING, TIMOTHY, LL.D.: 1745, July 17—1829, Jan. 29; b. Salem, Mass. He graduated from Harvard College 1763; after studying law was admitted to the bar, and began practice at Salem 1768; was register of deeds several years, and an officer of militia 1766–76. He commanded a force which made an unsuccessful attempt to capture the British on their retreat from the battle of Lexington; was appointed judge of one of the maritime courts; was a member of the legislature 1776; and toward the close of that year joined the continental army with 700 troops from Essex co., resigned his civil positions, and 1777, June, became adjt.gen. He was a member of the board of war, and from 1780, Aug. 5, till the office was abolished 1785, was quartermaster-gen. of the army. For a short time he was in mercantile business in Philadelphia, then retired 1787 to the Wyoming valley, where he had a large tract of land; was involved in the political troubles of that region, and was kept a prisoner for three weeks by a gang of masked men. He was the Luzerne co. delegate to the state constitutional convention 1789–90, and in the latter year was appointed by Pres. Washington to negotiate a treaty with the Six Nations, in which mission he was highly successful. He was postmaster-gen. 1791–95, sec. of war a part of the latter year, and sec. of state 1795–1800. Largely through his influence, the West Point Acad. was founded. On leaving the state dept., he retired to Wyoming, where he lived in a log-house. Learning of his financial troubles, friends in Boston purchased part of his land, which placed him in easy circumstances. He returned to Mass., was appointed judge of a common pleas court 1802, was elected to the U. S. senate to fill a vacancy 1803, and elected for a six years' term 1804, was an extreme federalist, was defeated for re-election at the close of his term, but was elected representative 1814. He was a member of the governor's council 1817, and afterward retired to Salem, where he died. The *Life of Timothy Pickering* (4 vols.), commenced by his son Octavius P., was completed by the Rev. C. W. Upham.

PICKEROON: see PICAROON.

PICKET, n. *pĭk'ĕt* [F. *piquet;* OF. *picquet*, a peg, a stake]: a sharp-pointed stake: small number of men placed as a guard of observation at a short distance from an army (see below): V. to fasten to a picket or stake stuck in the ground, as a horse; to place or post as a guard of observation. PICK'ETING, imp. PICK'ETED, pp. INLYING PICKETS, detachments in camp fully equipped, and ready to turn out on any alarm, as to put down disorders or protect property in case of fire. OUTLYING PICKETS, detachments at some little distance from camp for observation, and to guard against surprises. PICKETING, or PICKETTING, n. *pĭk'ĕt-ĭng*, in a *trade union*, the practice of appointing a small body of their number to watch a shop or manufactory in which the union men are out on strike, to intimidate non-union men who may be working in it.

PICK'ET: in military language, a stake shod at its point and sometimes ringed at its top with iron, driven into the ground, and used to sustain ropes which mark off sections in a camping-ground, or for tying horses to: these pickets are four or five ft. long. Short pickets about eight inches long are employed as anchors for the ropes extending tents.—In fortification, pickets are pointed stakes for pinning gabions together and to the ground; also, when pointed at both ends, and driven into the ground close together, of different lengths, and in a position inclined toward the front, they form a powerful obstruction to the advance of a storming-party, and are of great effect in breaking a line of soldiers.—*Picket* was formerly a military punishment, where the culprit was held by the raised arm in such a position that his whole weight fell on one foot, which was supported on a picket with a blunt point. The time the man thus stood was proportioned to the offense. The punishment became, after a few moments, extremely painful: it has long been discontinued on sanitary grounds.

PICKETT, *pĭk′ĕt*, GEORGE EDWARD: 1825, Jan. 25—1875, July 30; b. Richmond, Va. He graduated from West Point 1846, was in the war with Mexico and was brevetted lieut. and capt., was afterward promoted capt., and for some years was at Puget Sound, where he rendered important service during the n.w. boundary dispute with Great Britain. 1861, June, he resigned; the following Sep. was appointed col. in the Confederate army, and 1862 was promoted brig.gen. and maj.gen. He distinguished himself in many battles, including those of Gaines's Mill, Gettysburg, and Five Forks; and after the war engaged in the life insurance business. He died at Norfolk.

PICKLE, n. *pĭk′l* [OE. *pikil*, *pykyl;* Dut. *pekel;* Ger. *pökel*, brine]: lye of brine or vinegar used in preserving food: a mess; a disagreeable position; a position of difficulty, embarrassment, or disorder: a troublesome child: V. to preserve or season with salt, vinegar, etc. PICKLES, n. plu. *pĭk′lz*, vegetables or fruit preserved in vinegar, etc. (see below). PICK′LING, imp.: N. the preservation of vegetables or meats in brine, vinegar, etc.; the brine, vinegar, etc., for preserving certain kinds of food. PICKLED, pp. *pĭk′ld:* ADJ. preserved in brine or pickle. A ROD IN PICKLE, a rod soaked in brine to make the punishment more severe—hence, a punishment of any sort held in reserve. PICKLE-HERRING, in *OE.*, a merry-andrew; a buffoon; a jack-pudding.

PICKLE, n. *pĭk′l:* in *Scot.*, a grain of corn; a small quantity. PIGHTEL, n., or PIGHTLE, n. *pī′tĕl*, in *OE.*, a small meadow; any small inclosed piece of land.

PICK′LES: vegetables or parts of vegetables preserved in vinegar; though the term *pickled* is applied also to animal substances, e.g., beef, pork, fish, etc., preserved in salt. The process employed is first to wash the articles intended for pickles in clean cold water; afterward to soak them a few days in a strong solution of salt in water. They are taken out, and, if fruits or roots, dried in a cloth; but if vegetables, e.g., cauliflower, etc., they must be well drained, then placed in the vessels intended to hold them, a few peppercorns, or other suitable spice, being sprinkled in from time to time. When the vessel is about filled, boiling vinegar is poured in until it is quite full; and it is tightly covered. Many persons prefer to boil the spices, of whatever kind used, in the vinegar; and some add the vinegar cold to such vegetables or fruit as are of naturally soft substance; because, except in the case of green walnuts, and one or two other fruits, extreme softness is objectionable in pickles. When the materials to be pickled are naturally green, e.g., gherkins or small cucumbers, French beans, etc., it is considered very desirable to preserve their color; and this is done sometimes by steeping vine, cabbage, spinach, or parsley leaves in the vinegar—their color being imparted through the vinegar to the pickles. As this requires great care and patience, some dealers resort to very reprehensible methods of coloring their pickles, such as boiling the vinegar in copper vessels, thereby forming an acetate of copper, which is green; or even directly adding that salt to the pickles. Serious results have frequently been produced by this poison.

The principal domestic pickles are the following.—*Cabbage.* Almost always is used the red variety; to this are frequently added slices of beet-root, agreeable in taste, and improving the color. The celebrated Spanish pickle is a mixture of the red cabbage and slices of the large Spanish onion. Sometimes, in the strong desire to improve the color, a little cochineal is added. The spices considered most suitable for pickled cabbage are white and black peppercorns, ginger, and mace. —*Cauliflowers.* Only the flower portion, with its white branches, is used; they are treated as cabbage.—*Gherkins,* or very young cucumbers. These require the same spices as the cabbage; but much care is requisite to keep their green color. This is the familiar household pickle; and there are many special plans for its preparation. A much approved method is to soak the gherkins in a brine of six ounces of salt to the quart of water for 24 hours; then drain or dry in a cloth, place them in jars, and pour in the pickle, composed of vinegar, with an addition to each quart of one ounce salt, a quarter-ounce black peppercorns, one ounce ginger slightly bruised, one or two blades of mace, and a dozen bay-leaves. After soaking two days, they are set on the fire until they simmer, and then replaced in the jars, which must be well corked, and covered with skin, to exclude the air.—*French Beans.* The young green pods are prepared in the same way as gherkins.—*Onions and Eschalots.* These are carefully peeled, and, after two days' steeping in brine, covered with boiling vinegar, to which the spice, usually black peppercorns, has been added. A small variety of onion, called the silver-skin, is generally used.—*Walnuts.* These are gathered green, and so tender that a pin can easily be pushed through them: they are useless when the shell has begun to form. They require at least a week's steeping in the brine. The vinegar must be poured on them boiling hot. The spices used are peppercorns, mace, ginger, and sometimes a little garlic and cloves.—*Mushrooms.* These are sometimes pickled only in brine, and are useful for gravies, etc., in winter. They are also preserved in vinegar; and must be washed in salt and water quickly, and then boiled in the vinegar, to which, besides the spices, a small quantity of salt is added.—*Nasturtiums.* The young green fruit or seeds of the Nasturtium plant, or greater Indian Cress (*Tropæoleum nasturtium*), make an excellent pickle, an admirable substitute for the foreign capers in sauces for various dishes; and alone are an agreeable pickle.—Several kinds of mixed pickles are made, the chief of which is *Picalilly*, or 'Indian Pickle'—a mixture of cucumber, cauliflowers, etc., with considerable mustard-seed and flour of mustard used as a spice, which gives it a bright yellow color.

Of imported pickles are the unopened buds of the beautiful plant *Capparis spinosa*, called *Capers;* olives, pickled both in brine and in vinegar, but chiefly in brine—both from s. Europe. From tropical countries are every variety of the capsicum—green shoots of bamboo—and the fruit of the mango, in much esteem wherever it is known, notwithstanding a turpentine flavor not agreeable at first. There are numerous other pickles of less importance, almost every soft part of wholesome vegetables being adapted for this mode of preparation. Pickles generally are considered provocatives to appetite; and if made properly and used judiciously, are wholesome and agreeable additions to food.

PICKLOCK, PICKPOCKET, etc.: see under PICK 1.

PICKWICKIAN, a. *pĭk-wĭk'ĭ-an:* pertaining or relating to Mr. Pickwick, the hero of the *Pickwick Papers*, by Charles Dickens: used especially in the phrase, a Pickwickian sense, i.e., a merely technical, parliamentary, or constructive sense: N. a member of the Pickwick Club.

PICNIC, n. *pĭk'nĭk* [Eng. *pick*, to eat by morsels; *nick*, the former familiar name of the tankard for liquor]: *originally*, an entertainment toward which each guest contributed; *now*, a pleasure-party on an excursion into the country, especially when they carry their own provisions, etc., with them; a kind of small sweet biscuit. *Note.*—The *picnic* is pre-eminently an English institution: the F. *pique-nique* is derived from Eng. *picnic*, and not *vice versa: pick* or *pic* simply indicates the informal way of eating the viands; and *nick* or *nic* the OE. familiar name for the tankards from which the liquors were drunk; or perhaps OE. *nick*, a coal-basket or hamper; perhaps, too, *nick*, the proper time, the time chosen: comp. also *knick-knacks*, trifles, indicating for PICNIC the sense, an eating of trifles in a free-and-easy way.

PICO, *pē'k :* one of the Azores Islands, midway between the e. and w. extremities of the group, a few m. s.e. of Fayal. It is 45 m. long, and 5 m. in average width; about 225 sq. m. It is traversed by a volcanic ridge, which rises 7,613 ft. in the Peak (Pico), whence the name of the island. See AZORES. Pop., descendants of Portuguese, (1881) 27,904.

PICO, *pē′ko*, GIOVANNI, DELLA MIRANDOLA: Italian philosopher and theologian, whose genius is inferior to his former reputation: 1463, Feb. 24—1494, Nov. 17; son of the sovereign prince of Mirandola and Concordia. At the age of 14, he was sent to the Univ. of Bologna; and afterward visited the principal schools of Italy and France, everywhere distinguishing himself by his extraordinary facility in mastering the most difficult branches of knowledge. His linguistic acquisitions embraced Latin, Greek, Hebrew, Chaldee, and Arabic, besides Italian and French; he was familiar with the different phases of the scholastic philosophy, and was versed also in mathematics, logic, and physics. At the age of 23, he returned to Rome, when Innocent VIII. was pontiff; and immediately sought an opportunity of showing his learning in the most striking manner, by publicly posting up no fewer than 900 theses or propositions in logic, ethics, physics, mathematics, theology, natural and cabalistic magic, drawn from Latin, Greek, Jewish, and Arabic writers; offering to maintain an argument on each against all the scholars of Europe, and undertaking to pay the expenses of those who came from a distance. P. presumptuously entitled his theses *De Omni Re Scibili* (On Everything That Can Be Known), and Voltaire sarcastically added, *et de quibusdam aliis*. P. had several encounters with notable scholars, and is reported to have come off victorious. But his success was the cause of misfortune. The church appointed a committee to report on the propositions of the young prince, and the result was that several of them were condemned as 'heretical,' though the author was acquitted of any heretical intentions. The handsome and gay young nobleman, a great social favorite, then withdrew from Rome, and settled in Florence, where he austerely gave his whole time to the composition of polemical treatises against Jews and Mohammedans, and to the refutation of judicial astrology. During the last three years of his life, he was growing more devotional and more inclined to religious meditation: he had given to the poor much of his ancestral wealth, and was designing to give up all, and to go through the world preaching Christ, when a sudden fever ended his days at the age of only 31. A complete ed. of his works was pub. Bologna 1496; since frequently reprinted. Among his many writings are *Conclusiones Philosophicæ, Cabalisticæ et Theologicæ*—the famous propositions which excited ferment at Rome. P. is an illustration of the immediate effects produced in literature by the 'revival of letters;' he is full of a specious kind of universal learning, zealous and enthusiastic, but destitute of originality, depth, or creative power. His personal character has always been interesting.

PICOLINE, n. *pĭk′ō-lĭn* [L. *pix* or *pĭcem*, pitch]: an oily volatile liquid having a strong odor and an acrid bitter taste, obtained from coal-tar and naphtha, and present in tobacco.

PICOT, n. *pĭk′ot:* a little loop or lobe used to ornament needle-made laces of all kinds, and often introduced into embroidery.

PICOTEE, n. *pĭk′ō-tē′* [F. *picoté*, pricked, pitted; *picoter*, to tease—from *piquer*]: one of the florist's varieties of *Dian′thus car′yŏphyl′lus*, ord. *Car′yophyllācĕæ;* a variety of carnation having the flower-leaves notched and spotted, generally upon a yellow ground: see CARNATION.

PICQUET: a spelling of PIQUET 2, which see.

PICRA, n. *pī′kra* [L., a medicine made of aloes: Gr. *pikra*, an antidote—from *pikros*, sharp, bitter, pungent]: an officinal powder, containing four parts of aloes and one of canella; used in Europe as an electuary, and in America as a cathartic.

PICRIC ACID, *pī′krĭk* or *pĭk′rĭk ăs′ĭd* [Gr. *pikros*, bitter], ($C_6H_2(NO_2)_3{\cdot}OH$); called also Trinitrophenol, Nitrophenic acid, Carbazotic acid: one of the ultimate products of the action of nitric acid on indigo, and upon wool, silk, several resins, particularly the resin of *Xanthorrhœa hastilis* (the Yellow Gum of Botany Bay), and salicin and some of its derivatives. But it is most economically obtained from phenol (carbolic acid). One part of phenol is gradually added to strong nitric acid slightly warmed, and, when the first violent reaction has subsided, 3 parts of fuming nitric acid are added, and the liquid is boiled till nitrous fumes are no longer evolved. The resinous mass thus produced is boiled with water; the resulting P. A. is converted into sodium salt; and the solution mixed with sodium carbonate, which throws down the sodium picrate in crystals. P. A. crystallizes in yellow shining prisms or laminæ. It has an intensely bitter taste; melts at 249·4° F., and sublimes when cautiously heated; dissolves sparingly in cold water, more easily in hot water, more freely in alcohol. It stains the skin deep yellow, and is used as a yellow dye for wool and silk. It is a strong acid, forming well-crystallized yellow salts which detonate violently when heated, some of them also by percussion.

Picrocyanic or *Isopurpuric acid* ($C_8H_5N_5O_6$), which is not known in the free state, is formed as a potassium salt ($C_8H_4N_5O_6K$), by dropping a hot solution of P. A. (1 part to 9 of water) into a solution of potassium cyanide (2 parts cyanide in 4 of water) heated to 140° F. This salt crystallizes in brown-red scales having a green metallic lustre, sparingly soluble in cold water, dissolving in hot water and in alcohol with deep red color. It detonates strongly when heated.

PICROLITE, n. *pĭk′rō-līt* [Gr. *pikros*, bitter; *lithos*, a stone]: a fibrous variety of the mineral serpentine, of a leek-green color, passing into yellow.

PICROMEL, n. *pĭk′rō-mĕl* [Gr. *pikros*, bitter; *meli*, honey; L. *mel*]: a peculiar sweet-bitter substance found in bile.

PICROTOXIN, or PICROTOXINE, n. *pĭk′rō-tŏks′ĭn*, or PIC′ROTOX′IA, n. *-ĭ-ă* [Gr. *pikros*, bitter: Gr. *toxĭkon;* L. *toxĭcum*, the poison in which arrows were dipped] ($C_{12}H_{14}O_5$): the poisonous narcotic principle forming the active bitter ingredient in the berries of the *Cocculus indicus* from which it may be extracted by boiling alcohol, or by water containing a little hydrochloric acid. It crystallizes in colorless prisms. This substance is extremely poisonous, one-third of a grain being sufficient to kill a cat in ten minutes. PIC′ROTOX′IC, a. *-ĭk*, of or pertaining to.

PICT, n. *pĭkt* [L. *pictus*, painted]: a person whose body is painted.

PIC′TOR, FABIUS: see FABIUS.

PICTOU, *pĭk-tô′:* thriving seaport on the n. coast of Nova Scotia, on the n. shore of an ample and perfectly protected harbor, 85 m. in direct line n.n.e. of Halifax; lat. of light-house 45° 41′ n.; long. 62° 40′ w. It is in a fertile and well-cultivated district, with extensive coal mines and quarries of building stone in the vicinity. It exports building stone, dried fish, and potatoes. Commerce is rapidly increasing; ship-building is vigorously carried on. The mean summer temperature is 63°·52; mean temperature for the year 42°·09. Pop. (1881) 3,403; (1891) 2,999; (1901) 3,235.

PICTS, n. plu. *pĭkts* [AS. *Pihtas* or *Peohtas*, the Picts]: ancient n. British tribe of unknown origin. PICTISH, a. *pĭk′tĭsh*, of or pertaining to the Picts.—The *Picts* were ancient inhabitants of the n.e. provinces of Scotland. Everything connected with the history of the P. has been matter of controversy; and it is not easy to ascertain the truth, where the information given by early writers is so scanty, and where most modern authors seem only to have looked for materials to support a favorite theory.

The 'Picti' of the Romans probably represented a word by which the nation was known in its own language, as well as the barbaric custom to which the well-known expression of Claudian, 'nec falso nomine Pictos,' bears reference. More important is the inquiry regarding the origin and language of the Picts. This, among Scottish antiquaries, has been called emphatically 'the Pictish question:' respecting which the best-known and most amusing, and certainly not the least useful discussion, is that between Jonathan Oldbuck and Sir Arthur Wardour, in the 6th chapter of *The Antiquary*. The disputants can hardly even now be said to be agreed; but the prevailing opinion is, what sound criticism always pointed to, that the P. were a Celtic race—perhaps the first known inhabitants of northern Britain, and (as some hold) to be identified with the Caledonians of the Roman writers. At the time when they became generally spoken of under the name P., they occupied the whole territory n. of the Firth of Forth, except the w. portion, which had been colonized or subdued by the Scots, another Celtic nation, whose chief seat was in Ireland—the proper and ancient Scotland. The s. boundary of the P. was the Roman province of Valentia, embracing the territory between the two Roman walls. At a later period, when Britain was abandoned by its imperial rulers, the boundaries of the various nations occupying the n. part of the island may be traced with considerable distinctness. Making allowance for partial changes at various times, these boundaries may be regarded as the following: The Pictish territory extended along the whole sea-coast from the Firth of Forth to the Pentland Firth. It was bounded w. by the country of the Scots, which extended along the w. coast from the Firth of Clyde to the modern Ross-shire; but the precise line between the two nations cannot be ascertained. The country of the P. was bounded s. by the Firth of Forth and the province of Lothian, then possessed by the English; while the country of the Scots had for its s. boundaries the Firth of Clyde and the kingdom of Cumbria, held by the independent Britons.

The Pictish nation consisted of two great divisions, the Northern and the Southern P., the boundary between them being the mountain range known afterward as the Grampians. These divisions seem to have been ruled at some times by different princes, at other times by one sovereign. The P. were converted to Christianity at different periods. The Southern P. received the faith from St. Ninian, Bp. of Candida Casa, early in the 5th c. This is mentioned by Bede, and the fact itself has never been doubted; though controversy, as usual, has been busy with the details. The point in dispute is the location of the P. who owed their conversion to Ninian (q.v.). A careful examination of the statements of Venerable Bede, and the fuller but less trustworthy narrative of Ailred of Rievaux, shows that the Southern P., converted by Ninian, had their seat n. of the Forth; that they were, in fact, the great division of the Pictish nation occupying the country between the Firth and the Grampians. The labors of Ninian were carried on and completed by teachers whose names are well known to the readers of ecclesiastical history—Palladius, Serf, Ternan, and others. The Northern P. owed their conversion to a teacher of higher renown—St. Columba (q.v.). The life of that abbot, from his leaving Ireland 563, to his death 597, was chiefly spent in converting the Northern Picts. Their ruler at this time was Brude, son of Mailcon, whom Bede styles a very powerful king. His chief residence was on the banks of the Ness, and there Columba baffled and confuted the heathen Magi in the manner recorded by his biographer Adamnan. It is impossible to ascertain the precise character of the superstitions held by the P. before their conversion. Those whom Adamnan calls Magi are by some modern writers styled Druids, and their religion is said to have been a species of Druidism —whatever that may be held to mean.

Brude, the first Christian king of the P., died 586. Catalogues are preserved, of more or less authority, of the sovereigns who succeeded him. It is impossible to reconcile the discrepancies of these lists, which probably contain the names of princes who reigned at the same time in the n. and s. divisions of the kingdom. The limits of the Pictish territories continued much the same till the middle of the 7th c., when a portion of the s. province was subdued by Oswy, King of Northumbria. In the beginning of the reign of Oswy's son and successor, Egfrid, the P. made an attempt to recover the territory which had been wrested from them. It was unsuccessful; and the power of the English was so firmly established, that the conquered province was erected into a diocese separate from Lindisfarne, the seat of the bishop being fixed at Abercorn. Encouraged by the success which had attended his enterprises, Egfrid seems to have contemplated the subjugation of the whole Pictish kingdom. He advanced northward with his army; Brude, son of Bili, King of the P., retreating before him. The English sovereign passed the Tay, and the P. made a stand at Nechtansmere, supposed to be Dunnichen, in Angus. A conflict ensued; the English were utterly defeated, and their king was slain. The consequences of this battle, 685, May 20, were very important. The P. recovered the whole territory which they had lost, and even subdued for a time a portion of the proper Northumbrian kingdom.

The next Pictish prince whose name calls for special notice is Nectan, son of Dereli, who succeeded about 710. He cultivated learning to some extent, and aspired to the position of an ecclesiastical reformer. The Pictish Church held precisely the same doctrines as the English; but it differed in various points of ritual, the most important of which related to the proper time of keeping Easter. The king applied for advice to Ceolfrid, Abbot of Jarrow, and the answer, which is addressed 'To the most Excellent Lord, and most Glorious King, Nectan,' is preserved among the works of Venerable Bede. Encouraged by this epistle, he summoned a council of his clergy and nobles, and enjoined them to observe the English usages. The royal command met a ready obedience. He had also applied to the abbot of Jarrow for architects to build a church of stone in the Roman fashion, which he proposed to dedicate to St. Peter. We are told by Bede that the architects were sent, but have no further information on this interesting subject. The plans of the king were probably interrupted by dissensions among his people; and the entire assimilation of the ecclesiastical institutions of northern Britain to those of England was postponed for four centuries.

The most active of all the Pictish sovereigns was Hungus, son of Urgust, who succeeded 730, and reigned 30 years. He was engaged in constant wars with the Scots, the Britons, and the English, in which he was generally victorious. After his death, the kingdom began to decline. The history of its latest period is involved in impenetrable obscurity; all that we know is the final result. Various princes claimed the crown, and held possession of portions of the kingdom. But the most powerful competitor was Kenneth, son of Alpin, King of the Scots, who was descended, in the female line, from the ancient sovereigns of the P., and was probably the true inheritor, according to the peculiar law of succession said to have existed among that nation. Kenneth was acknowledged as king 843, and fixed his residence at Forteviot in Stratherne, cap. of the Pictish kingdom.

A famous passage from Henry of Huntingdon has often been quoted in illustration of the supposed utter destruction of the P., of their princes, their race, and their language. It is referred to in that sense at the close of the following sentences of a work written some time before, but not published till 1864: 'The Pictish vessel is seen in the distant horizon; she approaches rapidly, till you clearly distinguish the crew upon the deck; but before you are near enough to hear their voices, she sinks, the waters close over her, and the wreck never can be raised. The total extinction of the Pictish language renders any further inquiry impossible.

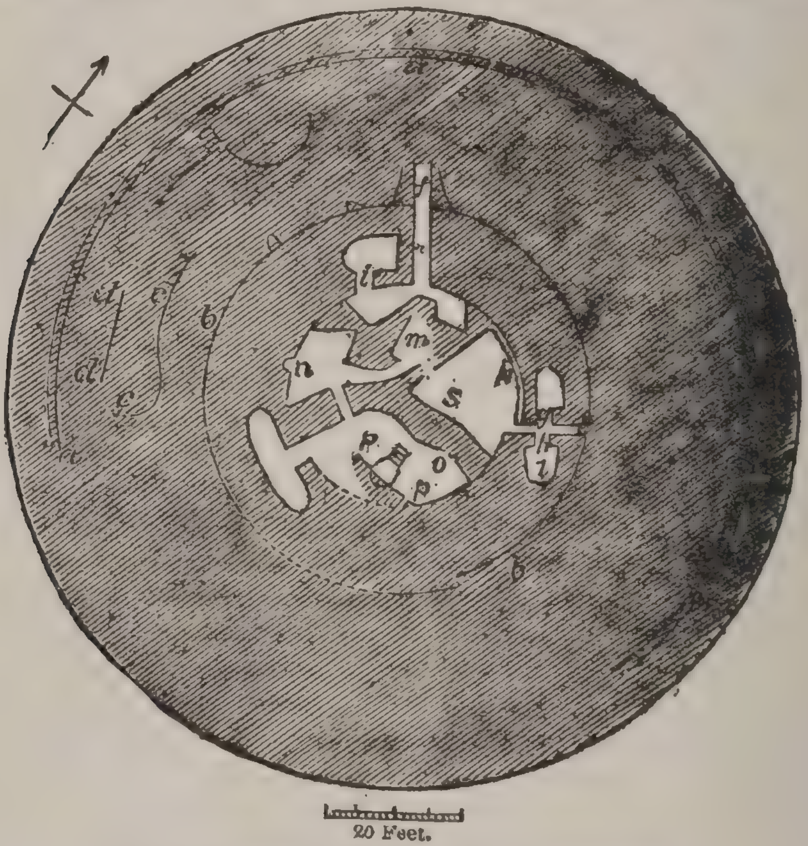
The acumen and criticism of the 19th c. cannot advance beyond the homely wisdom of the 12th c.'—Sir Francis Palgrave's *History of Normandy and England*, iv. 294.

The impression conveyed by such words is erroneous. The Pictish princes still continued to reign in the persons of Kenneth and his descendants. They were kings of the P. in reality and by race, as much as James I. and his successors were kings of England. The princes did not cease in one case more than in the other to be sovereigns of the larger kingdom, because they had previously ruled in the lesser one. Neither did the nation of the P. cease to exist. They dwelt as before in their own land; their old capital was the capital of the new kingdom; and Pictavia is spoken of by the chronicles long after the accession of Kenneth, and long before Scotia became identified with northern Britain, or ceased to be the ordinary name for Ireland. Undoubtedly, through the influence of the kings, and perhaps of the clergy, whom the later Pictish princes had held under oppressive bondage, the Scots became the predominant race, and finally gave their name to the united kingdom and nation. Neither did the language of the P. cease to be spoken. It continued, as before, to be the dialect of the n.e. provinces, till, first in the extreme n., it yielded to the Scandinavian invader, and afterward—more than two centuries subsequently to the accession of Kenneth —it began to recede slowly before the Teutonic tongue of English and Flemish colonists. The same process which destroyed the Celtic language of the Pictish people destroyed the Celtic language also of the British kingdom of Cumbria. Recent ethnologists have, however, suggested that the Picts may, in blood and descent as distinguished from language, have been mainly pre-Celtic and pre-Aryan (see Elton's *Origins of English History*, 1882); and Rhys affirms (*Celtic Britain*, 1883) that the North Picts were Ivernian (Euskarian and non-Aryan) in language also. Skene holds that Pictish 'is not Welsh, neither is it Gaelic; but it is a Gaelic dialect partaking largely of Welsh forms.' More specifically, he holds that Pictish, as compared with Gaelic, was a *Low* dialect—that is, differed from Gaelic in much the same way that Low German differs from High.

The chief ancient authorities for the history of the P. are Adamnan's *Life of St. Columba*, ed. by Dr. Reeves; the *Ecclesiastical History* of Venerable Bede; the *Life of St. Ninian*, by Ailred of Rievaux, in Pinkerton's *Ancient Lives of Scottish Saints;* the Pictish Chronicle, in the appendix to Innes's *Critical Essay on the Ancient Inhabitants of Scotland*, and in the appendix to Pinkerton's *Inquiry into the History of Scotland;* and the *Irish Annals*, ed. by O'Conor. The best modern works on the subject are Innes's *Critical Essay*, and his *Civil and Ecclesiastical History of Scotland;* Pinkerton's *Inquiry;* Chalmers's *Caledonia*, i.; Ritson's *Annals of the Caledonians, Picts, and Scots ;* Grub's *Ecclesiastical History of Scotland*, i. ; a dissertation in Garnett's *Philological Essays ;* and

W. F. Skene in *Four Ancient Books of Wales;* and in *Celtic Scotland* (2 vols. 1875–77).

PICTS' HOUS'ES: name popularly given in many parts of Scotland to the rude underground constructions, more commonly and accurately called EARTH-HOUSES (q.v.). The name is often given also to a more advanced class of structures of the same kind, found in the more northern counties of Scotland. The ground-plan of one of these at Kettleburn, in Caithness, is figured in the accompanying cut. The outmost circle represents the extreme limits of the mound which covered the structure; *a*, a bounding wall, three ft. thick, and three ft. high, rudely built of large unshaped stones; *b*, an inner wall, four or five ft. high; *c* and *d*, fragments of walls faced outward; *e* and *f*, passages leading to the inner chambers; *g*, *h*, and *i*, passages leading to smaller side-chambers; *k*, a wall within the wall of the chamber *s;* *m*, a chamber, so ruined that its walls could not be traced all round; *n*, a large bowlder, which, being difficult to remove, had been built over; *o*, a chamber containing a regularly built well (between *p* and *p*), nine ft. deep, and roofed over. The walls were built wholly without mortar. The objects found within them were remains of animals and shell-fish, fragments of pottery, and implements of stone, bone, horn, bronze, and iron. The name of Picts' Houses is also occasionally given in n. Scotland to rude stone structures above ground.



Pict's House at Kettleburn—Ground-plan.

PICTURE, n. *pĭk′tūr* or *-chûr* [L. *pictūra*, a painting—from *pingo*, I paint: It. *pittura;* F. *peinture*, painting, a picture]: any likeness or resemblance made on a flat surface with colors; a drawing; the work of a painter; a representation or description in words; a resemblance: V. to paint a resemblance of in colors; to form an ideal likeness of; to describe in a florid or vivid manner; to portray. PIC′TURING, imp. PIC′TURED, pp. *-chûrd:* ADJ. painted; drawn in colors. PICTORIAL, a. *pĭk-tō′rĭ-ăl*, pertaining to pictures; illustrated by pictures. PICTURE-BOOK, a book for children, illustrated with pictures. PICTURE-FRAME, the ornamental border or case made to contain a picture. PICTURE-GALLERY, rooms set apart for the exhibition of pictures. PICTURE-LINER, one who prepares and fixes the inner canvas of a picture.

PICTURES, COPYRIGHT IN: legal protection of rights of property in pictures, etc.: see COPYRIGHT. In the United States, this right is obtained in the same manner, for the same term, and on the same conditions as copyright in books; the remedy for infringement is also the same.—In Great Britain, the statute law provides that if any one, without consent of the proprietor for the time being, repeat, copy, colorably imitate, or otherwise multiply a copyrighted painting, drawing, or photograph, for sale, hire, exhibition, or distribution, or cause this to be done, or knowingly import or sell, etc., such copies, he shall forfeit to the proprietor of the copyright a sum not exceeding £10, and the copies and materials shall belong to such proprietor. Moreover, if any person affix a mark, monogram, or initials of a person who did not execute or make such work, to painting, drawings, or photographs, or fraudulently sell, exhibit, or offer such for sale, such persons shall forfeit £10, or double the price of the thing sold, etc., and all spurious copies and imitations become forfeited to the real owner.

PICTURESQUE, a. *pĭk′tū-rĕsk′* [F. *pittoresque*—from It. *pittoresco*, picturesque, pictorial—from L. *pictūra*, a picture]: having that striking kind of beauty which impresses the mind on beholding the rough and rugged, or the lovely and the wild, grouped together in nature; striking the mind with great power or pleasure by the natural or artificial grouping of objects; romantic. THE PICTURESQUE, the striking and peculiar beauty in certain groupings of objects. PIC′TURESQUE′LY, ad. *-lĭ*. PIC′TURESQUE′NESS, n. *-nĕs*, the state of being picturesque.

PICUL, n. *pĭk′ŭl:* in *China*, a weight of 100 catties or 1,600 taels, 133⅓ lbs.; also called by the Chinese *tan*.

PI′CUS AND PI′CIDÆ: see WOODPECKER.

PIDDLE, v. *pĭd′l* [prov. Ger. *pitteln*, to meddle with by picking or touching: Norw. *pitla*, to pluck, to pick: comp. Dut. *peuteren*, to pick with the finger: W. *pid*, a point]: to eat here and there a bit; to use the tips of the fingers in doing anything; to do light and trifling work by small touches. PIDDLING, imp. *pĭd′lĭng:* ADJ.

trifling; paltry. *Note.—Piddle* may be the same word as *peddle.*

PIDG′IN ENG′LISH: see Pigeon English.

PIE, n. *pī* [Gael. and Ir. *pighe*, a pie]: crust of baked flour (dough or paste) with something eatable in it or under it, as fruit or meat. *Note.*—The suggestion that *pie* may be a mere corruption of *pasty* is not probable. In one kind of pies, a dish is used, as in cases where much juice or gravy has to be retained: in another kind, no dish is used; the latter are called raised pies, and a particular kind of paste is required; which is made with hot lard and water, and must have sufficient consistency to stand up. When molded into the form or case of the pie, it is filled with meat, frequently game, and baked. This kind of crust is not usually eaten with its contents, as it is considered unwholesome; it serves chiefly as a case for the inclosed viands.

PIE, or **Pye**, n. *pī* [F. *pie*, a daw—from L. *pica*, a magpie: Skr. *pika*, the Indian cuckoo: comp. Gael. *pigheid*, a magpie (see Pica)]: the magpie; a party-colored bird; a printer's term for any quantity of mixed or unsorted types; the table or index for finding out the service of the day in the old Roman Church Service Book —supposed to be so named from the party-colored letters, the initial and principal letters of words having been printed in red and the rest in black. Piebald, a. *pī′bawld* [Gael. *pighe*, a bird; *ball*, a spot: W. *bal*, having a white streak on the forehead, said of the horse]: marked or speckled like a magpie; diversified in color, as, a piebald horse. Piet, n. *pī′ĕt*, or Piot, *pī′ŏt*, a magpie. *Note.*—In Cock and pie, a form of oath in Shakespeare, *cock* is a euphemism for God, and *pie* is the Church Service Book—see Skeat.

PIECE, n. *pēs* [OF. *piece;* F. *pièce*, a bit—from mid. L. *petium*, a piece: It. *pezza*, a patch, a rag: Sp. *pieza*, a bit of anything: Port. *peça*]: a fragment; a part; a patch; a literary or musical composition; a play; a picture; a coin; a cannon or single firearm; a gun or single part of ordnance; in *her.*, an ordinary or charge: V. to enlarge or mend by putting on or adding a part; to patch; to join. Piec′ing, imp. mending; making additions; joining two things together; lengthening by addition. Pieced, pp. *pēst.* Piec′er, n. *-ėr*, one who pieces; a factory-hand who attends on frames and spindles to join broken threads. Pieceless, a. *pēs′lĕs*, entire; not joined. Piecework, work done and paid for according to its amount. Apiece, ad. *ă-pēs′*, one by one; singly. Of a piece, of the same sort; alike. Piecemeal, a. [OE. *mele;* AS. *mœl*, a portion]: by portions at a time; single: Ad. in pieces; in fragments; gradually. Piece-goods, goods usually sold by pieces, as cotton, shirtings, long-cloths, sheetings, etc. Piece of eight, a piaster. To pieces, to utter ruin. To piece out, to extend or enlarge by the addition of one or more pieces.—Syn. of 'piece, n.': composition; firearm; share; portion.

PIED, a. *pīd* [from Eng. *pie*, a party-colored bird: L. *pica*, the painted one]: variegated with spots or streaks of different color; spotted. PIED′NESS, n. *-nĕs*, the state of being pied.

PIEDIMONTE D'ALIFE, *pē-ā-dē-mon′tā dâ-lē′fā:* town of s. Italy, 20 m. n. by e. of Caserta, at the base of the Appennines. Cotton-mills employ 1,500 hands. There are copper mines in the vicinity. Pop. about 6,000. (Piedimonte is the name of several smaller towns and villages in Italy and Sicily.)

PIEDMONT, *pēd′mŏnt*, or PIEMONT, *pē′mŏnt* [F. *pied*, foot; *mont*, mountain]: former Italian principality, now forming the n.w. part of the kingdom of Italy; inclosed mostly by natural boundaries, having on the n. the Pennine Alps, on the w. the Graian and Cottian Alps, on the s. the Maritime Alps and Genoa, and on the e. the Ticino and the duchy of Parma. Its territory includes the former duchy of Montferrat, which lies in its s.e. corner, what was the Sardinian portion of the old duchy of Milan. Area, 11,750 Eng. sq. m.; pop. (1901) 3,317,401. The mountain ranges which form its boundary on the n., w., and s., attain, in various places, a great elevation above the sea; the Col de Tende, Monte Viso, Mont Cenis, Mont Iseran, Mont Blanc, Mont St. Bernard, Mont Cervin, Monte Rosa, and the Simplon, all being on the boundary-line. As to its general character, the country is partly mountainous, partly hilly, and much diversified with hill and dale; the ranges which traverse the country being spurs from the alpine boundary, and converging toward the central tract, through which flow the Po and its chief tributary, the Tanaro. The valleys which separate these ranges are watered by rivers which take their rise in the Alps, and pour their supplies into either the Po or the Tanaro, according as they come from the n. and w., or from the s. The amount of the water-supply in the country may be imagined when it is considered that in P. the Po receives no fewer than 10 tributaries on the left, and 6 on the right, all of considerable size; and some, e.g., the Tanaro and Dora Baltea, properly classed as rivers. The valleys of the Po and Tanaro are exceedingly fertile, producing abundant crops of grain, pulse, hemp, chestnuts, olives, and many kinds of fruit. Maize and barley are the chief cereals, the former being the ordinary food of the inhabitants; while abundant herds of swine are fed upon the latter. The climate is mild in winter; but in summer, especially on the level country e. of the Dora Baltea and the Tanaro, the heat is scorching, and this portion would be rendered a sandy desert, were it not for the complete system of irrigation, which supplies moisture to more than half a million of acres, and renders the e. districts the granary of the country. So valuable is the privilege of using the water of rivers as a means of irrigation, that a considerable tax is levied on it. The other products of P. are wine and silk, which are very abundant, especially silk, which is the best in Italy, and is generally exported raw. The chief manufactures are silk, linen, woolen, and cotton goods, hosiery, paper, leather, cutlery, various fermented liquors, glass, and iron. The inhabitants are active and industrious: they belong mostly to the Rom. Cath. religion, but are more tolerant than in other parts of Italy. The Vaudois or Waldenses (q.v.) have from time immemorial inhabited the wild vales at the foot of the Cottian Alps, in the w. corner of the principality. Many of the Piedmontese, like the Swiss and Tyrolese, spend their youth and early manhood in travelling through other countries as dealers in engravings, jewellery, and other articles of merchandise, and, returning with a small hoard, spend the rest of their days in comfort in their native land.

P., in the 10th c., was possessed by the marquises of Susa, Ivrea, Montferrat, and Saluzzo; and it was not till when, a century afterward, the marquisate of Susa passed into the House of Savoy, that the latter, then counts of the Maurienne (the s. portion of Savoy), gained a footing in the country. At the commencement of the 12th c., the possessions of the House of Savoy were divided, and the lines of Savoy and P. formed; but they were again united, 1416, by Amadeus VIII. (afterward Pope Felix V.), who, in the following year, obtained from Emperor Sigismund the title Duke of Savoy, which they exchanged for that of king 1684. During the Spanish War of Succession, P. was increased by the addition of the provinces Alessandria, Valence, Lomellino, and the Val di Sesia (1703), by Tortona and Novara 1735–6, and by Vigevanase and Bobbio 1743. In 1796 it was seized by the French, and parcelled out into six departments, five being incorporated with France, and one with the kingdom of Italy; but after the fall of Napoleon, the House of Savoy recovered possession of it. See ITALY: SARDINIA: SAVOY. Since 1860, the name P., as a provincial designation, has been disused; and P. proper is now divided into the provinces Alessandria, Coni or Cuneo, Novara, and Turin.

PIEDOUCHE, n. *pyā-dôsh′* [F. *piedouche*—from It. *peduccio*, a console, a corbel]: in *arch.*, a bracket or pedestal to support a bust, candelabrum, or other ornament.

PIEDRA BLANCA, *pē-ā′drâ blân′kâ:* town of the Argentine Republic, S. America, 20 m. s. w. from Catamarca. Pop. 10,000.

PIEDROIT, n. *pyā-drwâ′* [F.—from *pied*, a foot; *droit*, straight, right]: in *arch.*, a pier attached to a wall. It has neither cap nor base, and so differs from a pilaster.

PIEGANS, *pē′ganz:* tribe of N. Amer. Indians in Montana, comprising originally two bands on the Marias, Teton, and Missouri rivers. They separated from the Blackfeet during the present century, under their chief, Piegan (‘the Pheasant’), from whom their name is derived. Though constantly at war with neighboring tribes, they were generally friendly to the whites. They ceded their lands to the U. S. govt. 1868, Sep. 1, for $1,000,000; 1874, Apr. 15, their reservation was reduced and their best lands taken. They then numbered about 2,400; but this number has been decreased by disease. Rom. Cath. missions established 1846 have been kept up, but the tribe is under the religious supervision of the Methodists.

PIELD, a. *pēld:* OE. for Peeled (see Peel 1); bald; bare.

PIEPOWDER-COURT, *pī′pow-dėr-kōrt* [OF. *pied pouldrè*, dusty-foot—from *pied*, a foot; *pouldrè*, dusty]: in *England*, an ancient court, now long obsolete, held in fairs and markets to administer justice in a rough-and-ready way to all comers; called also the Court of Dusty Foot, from the appearance of the litigants. Its jurisdiction seems to have been confined mostly to petty vagabonds, pedlers, and other wanderers. See Petty (Petty Sessions).

PIER, n. *pēr* [OE. *pere*, a pier: Dut. *beere*, a pier or mole—from *beuren*, to raise, to lift: Swiss, *büri*, a pier, a wall or mound raised to protect land from the encroachments of water—from *büren*, to raise]: mass of stone or wood work carried out into the sea or other water, and serving as an embankment for the protection of vessels, or as a landing-place; a wharf or landing projecting into a river; the solid stonework that supports an arch of a bridge or other building, of any shape, but not round as a pillar; the solid parts of walls between adjoining doors or windows, etc. The term is applied also to the great Pillars (q.v.) of a church—e.g., 'nave-piers.' Pier glass or mirror, a glass or mirror hung in the space between windows. Pier-table, a side-table fitted to the space between windows. Pier′age, n. *-āj*, toll for using a pier. *Note.*—Skeat derives Pier from OF. *piere*, F. *pierre*, a stone—from L. *petra*, a rock, a stone.

PIERCE, v. *pērs* [F. *percer;* It. *pertugiare*, to pierce]: to enter; to penetrate; to force a way into; to strike; to excite; to touch or affect, as the passions; to affect severely. Pierc′ing, imp.: Adj. penetrating; boring; sharp; keen; cutting. Pierced, pp. *pērst*, penetrated; entered by force: in *her.*, term indicating that a charge is perforated to show the field beneath it. The aperture is presumed to be circular, unless some other form—e.g., square-pierced or lozenge-pierced—be specified in the blazon. Piercer, n. *pērs′ėr*, one who or that which pierces. Pierc′ingly, ad. Pierc′ingness, n. *-nĕs*, the power of piercing or penetrating. Pierce′able, a. *-ă-bl*, that may be pierced.—Syn. of 'pierce': to force; touch; affect; move.

PIERCE, *pėrss* or *pērss*, Benjamin: revolutionary patriot, and gov. of New Hampshire: 1757, Dec. 23—1839, Apr. 1; b. Chelmsford, Mass. He was father of Pres. Franklin P., and his occupation was farming. On the day of the battle of Lexington, he enlisted in the patriot cause, and participated in the battles of Bunker Hill, Bemis Heights, etc., continuing in service to the end of the war, rising to the rank of capt. and brevet maj.; after the war, brig.gen. of militia. He was mem. of the N. H. legislature 1789–1802; twice councilor; many years high sheriff; and gov. 1827–29. His politics were Jeffersonian and Jacksonian, and he was leader of his party in his state. He d. at Hillsborough, N. H.

PIERCE, *pērss*, FRANKLIN: 14th President of the United States: 1804, Nov. 23—1869, Oct. 8; b. Hillsborough, N. H.; son of Gov. Benjamin P. After preparatory studies at Phillips Exeter Acad., N. H., he entered Bowdoin Coll., in the same class with Longfellow and Hawthorne, and graduated 1824, third in rank. His law studies were under the eminent Levi Woodbury of Portsmouth, and in part under Judge Edmund Parker of Amherst, N. H. He began practice of law in Hillsborough 1827; was a member of the legislature 1829–33, officiating two years as speaker; and was mem. of the national house of representatives 1833–37. His politics, like those of his father, were in opposition to the whig party. In congress he served on the judiciary and other important committees. Of his few speeches, one was against receiving petitions adverse to slavery, another against appropriations to the West Point School. In 1837 he became U. S. senator, youngest in that body; he sustained the war upon the Seminoles of Florida, who gave harbor to fugitive slaves; and denounced the whigs for removing their political opponents from office on the accession of Pres. Harrison. Resigning his senatorship 1842, he resumed the practice of law, in Concord, N. H.; declined a place in the cabinet under Pres. Polk, and a nomination to the governorship of N. H.; and in 1847, first as col., then as brig.gen., took command under Gen. Scott in the invasion of Mexico. Though severely injured by fall of his horse in the battle of Contreras, and fainting with pain at the battle of Churubusco, he refused to retire from active duty in the field. Returning home at the close of the war, he presided 1850 in the constitutional convention of his native state. In 1852 the democratic national convention had for its chief candidates Buchanan, Cass, Douglas, and Marcy; but, failing to unite, Gen. Pierce was nominated and received 282 votes, with 11 scattering; and, at the presidential election, all but 4 states gave him their vote, the whig candidate being Gen. Scott. His inaugural address asserted the constitutionality of slavery and of the fugitive slave law. During his administration, the Missouri compromise was repealed; the territories of Kan. and Neb. organized, with ensuing efforts to establish slavery there; Arizona was acquired as result of boundary dispute; the Pacific r.r. explorations were carried forward; the Commodore Perry treaty with Japan concluded; a treaty made with Gt. Brit. in regard to reciprocity with Canada; and a settlement effected of the fisheries question. In his message, 1856, Jan., he declared the free-state organization of Kan. an act of rebellion. The same year, Aug., he called an extra session of congress, and the army appropriation bill was passed without the previous house proviso, which was impartial toward the free-state movement. After Pres. Pierce retired from office, he visited Europe. During the civil war, he spoke in sympathy with the secessionists. He died at Concord. His life by Hawthorne was published 1852.

PIERCE, WILLIAM: about 1740–1806; b. Ga. He served throughout the revolution, part of the time as aide-de-camp to Gen. Greene, and for brilliant action was presented by congress with a sword. He was a member of the continental congress 1786–7, and of the convention by which the national constitution was framed and adopted; but not being in sympathy with the majority, he withdrew from the meeting, and the famous paper did not receive his signature. He wrote an account of the convention for one of the newspapers of the time, copies of which have been preserved in the Congressional Library.

PIERIAN, a. *pī-ĕr′ĭ-ăn* [from *Pieria*, a district of Thrace]: pertaining to the Muses. PIER′IDES, n. plu. *-dēz*, the nine Muses—from the patronymic termination *ides*, meaning literally *the daughters of* (the district of) *Pieria*.

PIERPOINT, *pēr′poynt*, FRANCIS HARRISON: born W. Va., 1814. He worked for his father till he attained his majority, graduated from Allegheny College 1841, and during the next three years taught school and studied law. He commenced practice 1844, was strongly opposed to slavery and to the secession of the disaffected states, and was elected provisional gov. of Va. by the convention of loyal citizens 1861, June. After serving six months, he was elected gov. by the loyalists for a term of two years, and afterward for four years. During a large part of the war period, the seat of his govt. was at Alexandria; but early in 1865 it was removed to Richmond. After his term as gov. expired, he engaged in developing the mineral resources of W. Va. He has served in the state legislature. In 1871 he presided over the general conference of the Meth. Prot. Church.

PIERPONT, *pēr′pŏnt*, JOHN: 1785, Apr. 6—1866, Aug. 26; b. Litchfield, Conn. He graduated from Yale College 1804, was a private tutor in S. C. 1805–09, studied law, began practice 1812, but was led by failing health to engage in mercantile business. He afterward studied theology, and 1819–45 was pastor of the Hollis St. (Unitarian) Church, Boston; pastor of a church in Troy, N. Y., 1845–49, and of a church in Medford, Mass., 1849–56; for a short time in 1861 was chaplain in the army, and afterward a govt. clerk at Washington. He was a noted temperance and anti-slavery worker, and a poet of considerable merit. Among his books were *Airs of Palestine*, and a *Digest* of customs, rules, and decisions. He died at Medford, Mass.

PIERRE, *pē-är′:* city, cap. of Hughes co., and of the state of S. D.; on the Chicago and Northwestern railroad and the Missouri river; about 120 m. w. of Huron. There are seven churches, of which two are Meth. Episc., and one, each, Bapt., Presb., Congl., Prot. Episc., and Rom. Cath.; good public schools, a high school; and McCormick Hall, collegiate institution under Presb. management. The number of scholars in the schools is 550. In addition to a full corps of teachers, a supt. is employed. One daily, one semi-weekly, and two weekly newspapers are published; there are three national banks (cap. $200,000), two state banks, an incorporated loan and trust co., and two private banks; and two fine hotels. There are gas-works, an electric light and power co., a system of water-works; various manufactures, including bricks and pottery; and there is large trade with the interior of the state. There are several miles of street railroad, a public park of about 80 acres in the heart of the city, and Farm Island (1,500 acres), in the Missouri river, a little below the city, which was given by the U. S. govt. for park purposes. Two new railroads are in process of construction. Assessed valuation of P. (1890) $3,100,000. Pop. (1890) 3,235; (1900) 2,306.

PIERREPONT, *pēr′pŏnt*, EDWARDS, LL.D., D.C.L.: 1817, Mar. 4—1892, Sep. 23: b. North Haven. He graduated from Yale College 1837, studied law, and began practice 1840 at Columbus, O. Five years later he settled in New York, and became a judge of the superior court in that city 1857, which office he resigned 1860. With Gen. Dix he was appointed 1862 to try the cases of parties confined in govt. forts and prisons. He labored for the re-election of Pres. Lincoln, and managed the prosecution of J. H. Surratt for complicity in the assassination of the president. He was atty.gen. for the s. district of N. Y. 1869–70, was active in opposition to the Tweed ring in New York, declined the ministry to Russia 1873, was U. S. atty.gen. 1875–6, and minister to Gt. Britain 1876–7. He has published several orations and written largely on financial subjects.

PIERRE′PONT, HEZEKIAH BEERS: shipping-merchant: 1768–1838; b. New Haven, Conn.; grandson of the Rev. James P., pastor of First Chh. (Congl.) New Haven. HENRY EVELYN P., of Brooklyn, N. Y., was his son. He was educated for commercial life; was agent for Watson & Greenleaf, Philadelphia, in purchasing the national debt; founded the firm of Leffingwell & P., that did extensive business in shipping provisions to France during the French revolution, until Great Britain seized American ships. In 1802 he married a daughter of William Constable, a New York merchant, by whom he became possessed of about 500,000 acres of land in the n. part of N. Y. Several years after his marriage he bought the Benson farm, in Brooklyn, and lived in that city till his death, applying himself entirely to the cultivation of that estate. The Brooklyn city hall and other public and private buildings were subsequently erected on the site of this farm. His eldest son, WILLIAM CONSTABLE P., became famous as a mathematician.

PIERRE'PONT (or PIERPONT), JAMES: Congregational minister: 1659–1714, Nov. 14; b. Roxbury, Mass.; son of John P., member of the colonial legislature. He was ancestor of several distinguished men, including Edwards P. After graduation at Harvard 1681, he became pastor of the First Church (Congl.) at New Haven, Conn., 1685. He was one of the originators of Yale College, induced Elihu Yale to give to the object, and was a trustee; and he is credited with composition of the 'Saybrook Platform' of the churches. His daughter married the great theologian Jonathan Edwards. He died in New Haven. A sermon by P., *Sundry False Hopes Discovered and Decryed*, preached in Boston, was printed 1712. His reputation was high for ability, character, and devotion.

PIERSON, *pēr'son*, ABRAHAM: 1607–78, Aug. 9; b. Yorkshire, England. He graduated at Cambridge 1632, and was ordained a minister of the established church, but, adopting non-conformist views, emigrated to New England 1639, and joined the First Church in Boston. He became pastor of the church at Southampton, L. I., 1640; but 1647 removed to Branford, Conn., with a few of his people, and there organized a church, of which he was pastor 23 years. He opposed the union of the colonies of Connecticut and New Haven 1662–65, and on its consummation removed with his people out of the colony, 1667, June. They carried away the church records and settled (as the First Church) in Newark, N. J., where P. remained till his death.

PIERSON, Abraham: 1641–1707, Mar. 7; b. Lynn, Mass.; son of Abraham P. He graduated at Harvard 1668, was ordained to the ministry the following year, and filled Congl. pastorates at Southampton, L. I., and Branford, Conn. He was his father's colleague at Newark, N. J., and afterward pastor of the Congl. Church, Killingworth, Conn., 1694–1707. He was one of the ten principal clergymen to found a college in Conn., 1700, and the next year was chosen its first pres. as 'rector of Yale,' holding the office until his death at Killingworth.

PIERSON, Arthur Tappan, d.d.: Presbyterian clergyman: 1837, Mar. 6, — ——; b. New York. He graduated at Hamilton Col. 1857, and at Union Theol. Seminary 1860. After pastorates at Binghamton, N. Y., Waterford, N. Y., Detroit, Mich., and Indianapolis, Ind., he became pastor (1883) of the Bethany (Presb.) Church, Philadelphia, after which for a period he supplied the pulpit of the Metropolitan Tabernacle, London, during Mr. Spurgeon's illness and for a period after his death. Dr. P. has for several years edited the *Missionary Review of the World.* Among his published works are: *Many Infallible Proofs* (1886); *The Crisis of Missions* (1886); *Evangelistic Work in Principle and Practice* (1887); *Keys to the Word* (1887); *The Divine Enterprise of Missions* (1891); *Miracles of Missions* (1891); *The New Acts of the Apostles* (1894).

PIERS PLOWMAN, *pērz plow'man*, or rather *The Vision of William concerning Piers the Plowman:* remarkable poem attributed to William Langland or Langeland or Langley, who was born, apparently in Shropshire, England, about the middle of the 14th c., was educated for the priesthood, and died in London near the end of the century. He is thought to have studied at Oxford, and to have been a monk at Malvern. The *Vision,* a powerful poem in vigorous alliterative verse, describes a series of nine dreams, in certain of which a person called Piers the Plowman appears. Its scene is laid in the Malvern Hills, on the Welsh border. Under allegorical covering, the *Vision* exposes and satirizes the manifold corruptions of the state, of the church, and of existing social arrangements. From the 43 MSS. which remain, it is evident that the poem, originally written about 1362, was repeatedly revised, altered, and extended, and that it continued to occupy the author all his lifetime.—An imitation is *Piers Plowman's Creede,* about 1390, a Wicliffite work.

The best ed. of P. P. is by W. W. Skeat, 1867–77.

PIETÀ, *pē-ā-tâ'* [Italian word signifying *piety,* in the sense of affection for relatives]: name in art for representations of the Virgin Mary embracing the dead body of her son; counterpart to the *Madonna* with the infant Jesus in her arms. One affords a representation of the purest joy and highest motherly love; the other, of the utmost pain and grief. The P. has long been a favorite subject with painters and sculptors.

PIETERMARITZBURG, *pē-tėr-mâr'ĭts-bėrg:* capital of Natal (q.v.); 50 m. from the coast. Pop. (1901) 30,000.

PIETISM, *pī'ĕ-tĭzm:* interesting and powerful religious movement in the Lutheran Church in Germany, during the last part of the 17th and first half of the 18th c. The term Pietists designates a religious party which, without forming a separate sect, had distinctive characteristics in opinion and in procedure. It is still applied to the same or like tendencies of opinion, feeling, and conduct. P. may be regarded as consisting in an exaltation of the importance of religious feeling and of godly practice, with a corresponding depreciation of doctrinal differences that do not concern the simple fundamental Christianity; and with a contempt for, or, at best, respectful indifference to, outward ecclesiastical arrangements. P. has been more or less strongly developed from time to time in all sections of the church; as the tendency toward it always exists in a large class of earnestly religious minds. This tendency has taken sometimes a disproportionate development. In the church of the middle ages, it was displayed in an endeavor to attain superior spirituality and purity by religious contemplation and asceticism; and many persons, consequently, embraced a monastic life. The Reformers, adopting the Augustinian doctrines, rejected this external mode of seeking deliverance from indwelling sin, and proclaimed the efficacy of faith in the sacrifice of Christ. But the controversies which arose among them, and increased among their successors, gradually gave a too exclusively doctrinal and polemical character to the sermons and writings both of the Lutheran and of the Calvinistic divines, particularly in Germany; and a reaction ensued, not at all toward the Church of Rome, but in favor of a religion of pious feeling and good works, or of the heart and life. Disgust at the sectarian bitterness and exclusiveness which prevailed led even to an undervaluing of disputed points; thus the *Pietism* of Germany was generated and developed. Its origin is referred to a work, *Vom wahren Christenthume*, by John Arnd, 1605; to the *Invitatio Fraternitatis Christi* of John Val. Andreæ, 1617, both Lutherans; and to the writings of Cocceius, a Calvinist. But its fuller development was due unquestionably to Spener (q.v.), in the latter part of the 17th c., and to his friends and disciples. The name *Pietists* was given first in contempt to certain young *docents* in Leipzig, who began 1689 to give prelections on the New Test. both to students and to citizens, and to addict themselves to a meditative mode of life. Spener had held meetings somewhat similar in his own house when preacher at Frankfurt-on-the-Main, and in his writings had urged the necessity of a reform in the Prot. Church and theology. He and his followers dwelt much on the importance of studying the Scriptures rather than the symbolical books, on the unfitness of any unconverted or unregenerate person for the Christian ministry, on the right and duty of the laity to take part in the exercises of Christian assemblies, and on the necessity of a practical religion rather than a systematized doctrine. But many of the extreme Pietists carried their antipathy to the doctrinalism and the established services of the church to a degree that alarmed the theologians of the old school, the 'high and dry' Lutherans, or German 'moderates,' who accused Spener and his disciples, not entirely without reason, of a tendency to make all goodness and virtue consist in mere religious feeling, or pious sentimentalism; to represent the Divine grace as operating in too sudden and abrupt a manner; to exaggerate the value of good works; to depreciate the value of learning and of clear intellectual perception in the study of Scripture; and to indulge in a strictness of judgment on the religious character of the ordained clergy, tending to sectarianism, and indeed incompatible with ecclesiastical unity. The weapons of argument, however, were not the only weapons employed against the pietists. The docents were compelled to give up their prelections, and finally to leave Leipzig; the meetings for mutual edification were suppressed by the government as disorderly conventicles; and Francke (q.v.), most distinguished of the Leipzig docents, having gone to Erfurt, was prevented from lecturing, and quickly compelled to retire. Spener's influence, however, procured a refuge for his friends in the newly founded Univ. of Halle, and Francke obtained a professorship there. Halle became thenceforth the source of new religious influences—indeed, of a new religious life to Germany. The Pietists, though spiritually exclusive—disposed to regard themselves as the 'chosen of God,' and to look down on all others as 'children of the world,' or even of the devil—did not attempt to form a separate sect. To do them justice, they were as far as possible from being ecclesiastically ambitious; all their desire was to excel in 'labors of love,' and to cultivate a disposition of intensest piety. The rise of the Wolfian or Rationalistic theology, the spread of that sort of skeptical anti-clerical philosophy which flourished for a while under the name *Aufklärung* (Enlightenment), exercised an injurious and depressing influence on P.; yet through all the long, obstinate warfare maintained against the doctrines of the church by the Rationalists, during the last half of the 18th and the most of the 19th c., P. continued to have adherents; and it is to the Pietists, and not to the dogmatists, that Germany is in great measure indebted for that revival of religious faith and feeling which, beginning with the great Schleiermacher—himself trained under pietistic influences—has since widely affected German biblical scholars and theologians. The patriotic enthusiasm called forth by the insolent conquests of the French naturally allied itself to pietistic tendencies; for in Germany, the triumphs of Napoleon even as *emperor* were viewed as the triumphs of revolutionary, republican, and infidel principles; and after the general restoration of peace, the statesmen and upper classes, especially in Prussia, believing that political security could be obtained only by a return of the populace to the simple obedient, and unquestioning piety of earlier times, countenanced this party in the church; and amiable tea-drinking societies of devout men and women were formed to distribute tracts, and to inoculate the radical and heathen masses with pietistic sentiments. But this attempt to use 'piety' for reactionary political purposes sullied its purity, and alienated from it the very parties which it sought to influence. Still, P. exists as a distinct element in the religious life of Germany; and now, as ever, its strongholds are Prussia (Berlin, Silesia, Wupperthal), Hesse, and Würtemberg. In Britain and America it is recognizable as a religious element of great though unknown force.

PIETRA-DURA, n. *pē-ĕt′ră-dū′ră* [It. *pietra*, stone; *duro*, hard]: name of the finest kinds of Florentine mosaic-work, in which the inlaid materials are hard stones, e.g., jasper, carnelian, amethyst, agate, etc. The real P.-D. work dates as far back as the 16th c., about 1570; and from that time to the present, has been almost confined to Florence, where a govt. *atélier* has existed ever since the beginning of the 17th c., which was originated to supply decorations for the Capella Medicea. It is called sometimes *Pietre Commesse*, and Lavoro di Commesso. In the inferior kinds, sold in Italy, and manufactured now extensively in Derbyshire and other parts of Britain, pieces of colored sea-shells are used instead of the harder and more valuable colored stones.

PIETRAPERZIA, *pē-ā′trâ-pĕrd′zē-â:* town of Sicily, six m. s.e. from Caltanisetta, on a lofty height. Pop. 10,000.

PIETRASANTA, *pē-ā-trâ-sân′tâ:* town in Italy, two m. from the Mediterranean, 17 m. from Pisa, 20 m. n.w. of Lucca. It is in a fertile country in which the olive and the vine are largely cultivated, has a massive citadel and is heavily walled. The streets are well laid out, and there are several public squares. Many of the buildings are old but are well preserved. Pop., including the commune, about 13,500.

PIETY, n. *pī′ĕ-tĭ* [F. *piété*—from L. *piĕtas*, piety—from *pĭus*, devout, pious: It. *pieta*, piety]: constant sense of dependence on the Supreme Being, attended with love and reverence of Him, and a disposition to know and obey His will; reverence of parents and obedience to them, with a constant effort to preserve their honor and promote their happiness—called also FILIAL PIETY. PI′ETIST, n. *-tĭst*, name applied to a sect in Germany toward the end of the 17th c. (see PIETISM, above): the term is applied sometimes (still, often as at first), in a derogatory sense, to an emotional Christian. PI′ETISM, n. *-tĭzm*, practices or teachings of the Pietists (see above). PIETIS′TIC, a. *-tĭs′tĭk*, of or pertaining to the Pietists: in a derogatory sense, affectedly religious.

PIEZOMETER, n. *pĭ′ĕ-zŏm′ĕ-tėr* [Gr. *pĭĕz′ō*, I press; *metron*, a measure]: instrument for measuring the compressibility of fluids. Oersted's (q.v.) instrument, the first by which the compressibility of water was satisfactorily determined, consisted of a cylindrical glass jar, into the neck of which a narrower cylindrical tube of glass, open at both ends, was firmly fixed. In this tube worked an air-tight piston by means of a screw. In the interior of the jar was placed a bottle, whose neck was drawn out into a long capillary graduated tube, and alongside this bottle was suspended a cylindrical tube, closed at the top, but open at the bottom. When the compressibility of any liquid was to be determined, the instrument was adjusted in the following manner: the bottle inside was filled almost to the top of the capillary tube with the fluid, and being replaced inside the jar, the latter was completely filled with water up to the piston in the neck. The liquid in the submerged bottle, then under pressure of the water above it, fell slightly in the capillary tube, being kept from contact with the water by an air-bubble, the motion of which up or down, according as the pressure was less or greater, served as an index showing the graduation. The suspended tube alongside being at first filled only with air, the water rose in it to some extent, and by graduations on the tube it was made to indicate the pressure in atmospheres or parts of atmospheres. Pressure was then applied to the water in the jar by screwing down the piston; the compressed water communicated the pressure to the liquid in the bottle and to the air in the suspended tube; the descent of the air-bubble in the former indicating the amount of diminution in bulk that the liquid had undergone (the capillary tube being graduatad in inches and parts of inches, and each inch of tube being known to contain a certain fraction of the contents of the bottle), while the ascent of the water in the suspended tube showed the amount of pressure which had been applied.

PIFFARO, n. *pĭf′ėr-ō*, or PIFFERO, n. *pĭf′ėr-ō* [It., a fife]: the old form of the oboe, still in use in some districts of Italy and the Tyrol; a rude kind of bagpipe with an inflated sheepskin for the reservoir, common in Italy, and seen occasionally in the streets of London.

PIG, n. *pĭg* [Dut. *bigge* or *big*, a pig: perhaps connected with Gael. *big*, little ones—from *beag*, little: Icel. *pika*, a girl]: the young of the sow kind; a name applied generally to swine (see HOG): one of the oblong masses of cast-iron as first extracted from the ore, and run from the smelting-furnace into rough molds made in a bed of sand—the larger oblong masses being called sows: V. to farrow or bring forth pigs; to herd or live together like pigs. PIG′GING, imp. PIGGED, pp. *pĭgd*. PIGGERY, n. *pĭg′ėr-ĭ*, a place where pigsties are erected and pigs kept. PIG′GISH, a. *-ĭsh*, like pigs. PIG-FACE, n. *-fās*, an Australian fruit having a sweetish and saline pulp. PIG-FACED, a. *-fāst*, having a face resembling that of a pig. PIG-HEADED, a. *-hĕd′ĕd*, stupidly obstinate. PIG-HEAD′EDNESS, n. the quality of being stupid and obstinate. PIG-IRON, cast-iron as first extracted from the ore in pigs. PIG-NUT, the ground-nut, the bulbous root of the plant *Bunĭŭm*, ord. *Umbellifĕrœ:* also, a species of Hickory (q.v.). PIG-RAT (see BANDICOOT). PIGSTY, a pen or hut for pigs. PIGTAIL, a long twist of hair falling down from the back of the head; tobacco twisted in small rolls. TO BUY A PIG IN A POKE, to make a purchase foolishly and without examination.

PIG, n. *pĭg* [Gael. *pige*, an earthen jar]: in *Scot.*, an earthen jar; a flower-pot. PIGS, n. plu. *pĭgz*, earthenware articles. PIG-WIFE, a woman who sells crockery. PIGGIN, n. *pĭg′ĭn* [Gael. *pigean*, a little earthen jar, a pot: Ir. *pigin*, a small pail: W. *picyn*, a piggin]: in *OE.*, a small vessel with a handle for holding liquids, generally of small wooden staves bound with hoops like a pail.

PIGEON, n. *pĭj′ŭn* [F. *pigeon*—from L. *pipĭōnem*, a young chirping bird—from *pipĭo*, I peep like a chicken: It. *pippione* or *piccione*, a young dove, a silly gull: Sp. *pichon;* Gael. *pighe*, a bird]: well-known bird of many varieties; the dove (see below): a simpleton; a person taken in by gamblers. PIGEON-BERRY (see PHYTOLACCA). PIGEON ENGLISH [*pigeon* or *pidgin* is said to be the Chinese corruption of *business*]: business English or talk; the absurd jargon of English used by those speaking English in their dealings with the native Chinese. PIGEON-HEARTED, a. timid; frightened. PIGEON-EXPRESS, intelligence transmitted by a written slip attached to a carrier-pigeon. PIGEON-FOOT, a plant. PIGEON-HOLE, the opening to the nest of a pigeon; in a *case* or *box frame*, one of a number of small openings for the storing of papers, letters, etc. PIGEON-HOUSE, a dove-cote. PIGEON-LIVERED, mild; soft; gentle.

PIGEON: name sometimes applied, like Dove (q.v.), to all the species of *Columbidæ* (q.v.), and sometimes almost restricted to those still included by ornithologists in the genus *Columba;* having a bill of moderate length, hard, and a little arched at the point, the base of the upper mandible covered with a soft thick skin, in which the nostrils are pierced; the feet with toes divided to the base, and formed both for walking and perching; the wings rather large and pointed; the tail of moderate length, and generally square at the end. The species of this group are numerous, and occur in almost all parts of the world. Some build their nests in trees, and some in holes of rocks; they lay only two eggs at a time, but breed twice or oftener in a year, and both the male and the female take part in incubation.

The United States species are made by systemizers to be of just as many genera as species. They are the Wild Pigeon (*Ectopistes migratorius*), length 15–17 in., wandering everywhere; the Carolina Dove (*Zenœdura Carolinensis*), 11–13 in., brownish-olive, bluish on crown and nape, purplish-red beneath, gilded neck, black spot on ear and wing coverts—abundant in temperate N. Amer.; the Zenaida Dove (*Zenaida amabilis*), 10 in., olive-gray with reddish tinge, crown and under parts wine-red—W. Indies and Flor. Keys; the White-winged Dove (*Melopeleia leucoptera*), 11–12 in., like Carolina Dove, but with broad white bar on wing and end of tail—s.w. and s.; the Ground Dove (*Chamœpeleia passerina*), only 6–6½ in.—s. United States to the Pacific, mostly coastwise; Scaly Dove (*Scardafella squamosa*), 8 in., like Ground Dove, but having body feathers with dark border, whence the name—s.w.; Key West Dove (*Geotrygon Martinica*), 11 in., white stripe below eyes and on throat—Key West (and W. Indies); Blue-headed Ground D. (*Starnœnas cyanocephala*), 11 in., structure and habits gallinaceous—same localities as the preceding; Band-tailed P. (*Columba fasciata*), 15 in.—Rocky Mts. to the Pacific. In Mexico, there is the Red-billed P. (*C. flavirostris*), 14 in. The White-headed P. (*C. leucocephala*) of the W. Indies is found also on the Florida Keys. The great centre of the Columbidæ is the Papuan region of the E. Indian archipelago, especially New Guinea; in that vicinity are ¼ of the species, 118; India 28; Australia 23; Africa 40; in both Americas not more than 80. The king of the family is the large Crowned P. 27 in., of the Papuan group. Among the most variously and highly colored are the fruit-eating pigeons of the E. Indies and Australia.

The original of all the varieties of the DOMESTIC P. is now almost universally believed to be the ROCK-P. or ROCK-DOVE (*C. livia*), the *Biset* of the French, a bird of extensive geographical range, found as far n. as the Faröe Islands, and on many parts of the coasts of Europe, Asia as far as Japan, and n. Africa, breeding in crevices of rocks, and often within caverns which open on the sea. It swarms in prodigious numbers in some rocky islands of the Mediterranean; and even on the British coasts, great numbers are found in some localities, particularly in the Orkneys and Hebrides. Its food consists partly of mollusks and other small animals, partly of grain and seeds; and it often makes unwelcome visits to the corn-fields of its vicinity. In a wild state, this bird has great uniformity of both size and plumage; being not quite 12 inches in length from tip of bill to end of tail; prevailing color bluish-gray, in some parts with green and purple reflections, two broad and distinct bars of black across the closed wings; lower part of the back white; tail deep gray, with a broad black bar at the end; bill blackish-brown; legs and toes reddish-orange.—Until recently, naturalists generally confounded this species with the STOCK-DOVE or SMALLER WOOD-P. (*C. œnas*), a species which inhabits woods, and whose geographical range is the same as that of the ring-dove.—The RING-DOVE, WOOD-P., or CUSHAT (*C. palumbus*), is the most common British species, and is diffused over great part of Europe, temperate Asia, and n. Africa. The RING-TAIL P. (*C. Caribbea*) is a W. Indian species, valued for the richness and delicacy of its flesh, reckoned one of the great luxuries of that part of the world.

1, Ring-dove, Cushat, or Wood-pigeon; 2, Biset, or Wild Rock-pigeon; 3, Collared Turtle.

Only one species of P. has been truly domesticated, and having long been so, it has undergone many remarkable changes, and there are numerous varieties or breeds; some, exhibiting very strange peculiarities, and known as *fancy pigeons*, being carefully preserved and tended by pigeon-fanciers. Pigeon-fancying is nowhere carried further than in London. The prices of such fancy pigeons as are deemed most perfect of their kind, are very high. The ordinary domestic pigeons, kept for profit as a kind of poultry, differ from the wild rock-dove chiefly in color, in which they are often very unlike it, though a tendency always manifests itself to return to the original colors, and the bars on the wings are apt to reappear in the progeny even of what may be called the most artificial varieties. Of these, among the most interesting are the Rough-footed P., having the feet feathered; the Jacobin, which has a range of feathers inverted over the head and extending down each side of the neck as a hood; the Fan-tail or Fan-tailed Shaker, in which the number of the tail-feathers is greatly increased, and the bird has the power of erecting its tail like that of a turkey-cock, while it has also a peculiar vibratory motion; the Tumbler, so called from tumbling in the air in its flight, and further characterized by a very short bill; and the Pouter or Cropper, which has the power of blowing up its crop to an extraordinary degree, so that the head seems fastened on the top of an inflated bladder. The Carrier P. (q.v.) is regarded as a variety of the Common Pigeon. There are 150 tame races of the domestic P. that breed true, besides some wild races in Egypt and Asia, with separate names.

For the profitable keeping of pigeons, it is necessary to have a properly-constructed dovecote, divided into cells, a cell for each pair, each cell 16 inches broad, by 12 from front to back, and the door toward one side, so that the nest may not be seen from without; a slip of wood in front of each cell for the birds to sit and coo on. The dovecote must be placed at such height as to be out of the way of rats and other depredators; and must be frequently cleaned, otherwise it may probably be deserted by its occupants. It ought to be painted white, that color being very attractive to pigeons, and lessening the difficulty of retaining them when a new dovecote is established. Pigeons begin to breed at the age of nine months, and breed every month except in very cold weather. The male and female continue faithful to each other from year to year—a circumstance noted by Pliny and others of the ancients, and evidently, as well as their somewhat demonstratively manifested affection, a reason of the poetic references often made to the dove.

PIG′EON COVE: village, Rockport tp., Essex co., Mass.; on the shore of the Atlantic Ocean, at the extreme point of Cape Ann (q.v.), about 33 m. n.e. from Boston, 2 m. from the village of Rockport, which is reached by the Boston and Maine railroad. Its little harbor is like a cup among the rocks. Its picturesque location and impressive rocky shore, with its ocean air, make it a favorite summer resort, and beside the early fishing-village, a village of hotels and cottages has sprung up. A fine quality of granite is quarried here.

PIG′EON (or PIDG′IN) ENGLISH [pigeon or pidgin doubtless from the Chinese pronunciation of 'business']: business-English; peculiar dialect used principally for commercial purposes as a means of intercourse between the natives and foreigners in China. The English, Portuguese, and Hindustanee tongues are represented in it; but it is extremely limited in range and nearly all the words used are either nouns or verbs, without proper inflection or grammatical construction. Though neither a written nor a printed dialect, and at best a miserable makeshift, there are a few schools in China in which it is taught, and a large part of the foreign business of the empire is transacted by its means.

PIGEON-HAWK: name applied to two birds: 1, *Falco columbarius*, its genus having the bill provided with a sharp tooth and notch in the upper mandible and a notch in the lower; its group, with tarsus having a double row of enlarged plates in front; in this species, the under parts are whitish on throat and yellowish below, streaked longitudinally with brown: a spirited little falcon.—2, The SHARP-SHINNED HAWK, *F. fuscus*, like the preceding in size (12–13 in.) and in slate-color above (female and young of 1, dark above; young of 2, brown above), but barred crosswise below, except the young, lengthwise.

PIGEON PEA (*Cajanus*): genus of plants of nat. order *Leguminosæ*, sub-order *Papilionaceæ*, of which, according to some botanists, there is only one species (*C. flavus*), native of the E. Indies, but much cultivated also in the W. Indies and Africa: according to others, there are two species, *C. flavus*, with flowers entirely yellow, the pod marbled with dark streaks, and two or three seeds in each pod; and *C. bicolor*, called CONGO PEA in the W. Indies, the pulse of which is much coarser, and is used chiefly by negroes. The finer kind is nearly equal to the Common Pea. This kind of pulse is much used in tropical countries. The plant is a shrub (*Cytisus cajan* of Linnæus) about 18 inches high. It is half-hardy in s. England. In tropical countries, the plants stand and are productive for several years. They throw off their leaves annually, and reproduce them together with their flowers. The P. P. is one of the most valuable tropical kinds of pulse. It grows either on rich or on poor soils. It is called *Doll* and *Urhur* in the E. Indies. The name P. P. in W. Indian.

PIGGIN, n. *pĭg′ĭn:* see under Pig 2.

PIGHTEL, or Pightle, n. *pī′tĕl:* see under Pickle 2.

PIGMENT, n. *pĭg′mĕnt* [L. *pigmen′tum*, a paint—from *pingo*, I paint]: any substance used as a paint or color (see Paints): the mucous secretion which covers the iris of the eye, and produces its various colors; a coloring matter found in nearly all the fluids and tissues of the body, which gives color to the skin. Pigment′al, a. *-mĕnt′ăl*, pertaining to pigments. Pigmen′tum ni′grum, *nī′grŭm* [L. *nigrum*, black]: a black pigment found in black and dark feathers of birds, in black human hair, in the skin, etc.

PIGMY, n. *pĭg′mĭ:* see Pygmy.

PIGNEROL′: see Pinerolo.

PIGNONS, n. plu., or Pinones, n. plu. *pĭn′ŏnz* [F. *pignon*, the kernel of the pineapple—from It. *pignone*—from L. *pinus*, the pine]: the edible seeds of the cones of various pines.

PIGNUS, n. *pĭg′nŭs* [L.]: in *law*, a pledge or security for a debt or demand.

PIGOTITE, n. *pĭg′ō-tīt* [after the Rev. Mr. *Pigot*]: a mineral compound of alumina and mudeseous [Gr. *mudēsis*, rottenness through excess of moisture—from *mudos*, damp]: acid, having a brownish-yellow color, found as incrustations on the sides of caves, etc.

PIGSNEY, n. *pĭgz′nĭ* [Gael. *beag*, little: AS. *piga;* Dan. *pige*, a girl]: in *OE.*, a term of endearment for a young girl; eye of a woman.

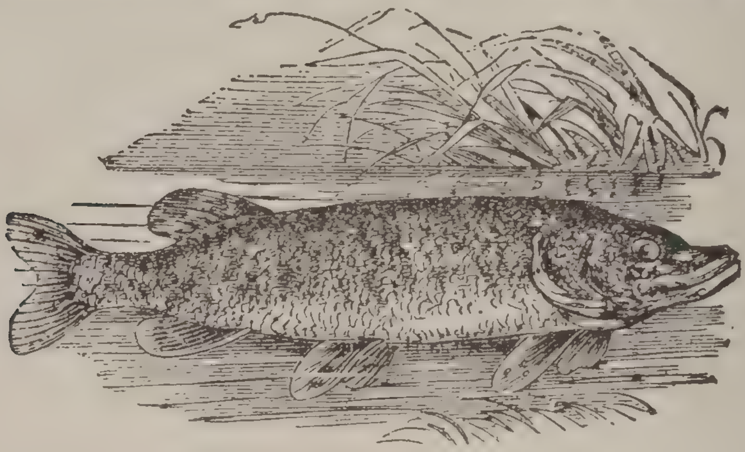
PIG-WEED, or Lamb's Quarters (*Chenopodium album*), of the Goosefoot family [Gr. *chen*, goose; *pous*, foot, referring to angular lobed leaves]: common weed around dwellings, farms, and roadsides, and known by its usual mealy foliage, the youngest leaves and spikes of inconspicuous greenish flowers, often red-iridescent, especially when damp with dew; some leaves (and in two varieties) green. There are 7 or more of the genus naturalized in N. America from Europe, and one or two from the tropics.—The Winged P. (*Cycloloma platyphyllum*), a coarse weed, leaves sinuate-toothed, and seed encircled by a membrane-wing, is found on the Mississippi and n.w. Spinach and beet belong to the same family.

PI′KA: see Lagomys.

PIKE, n. *pīk* [Ir. *pice;* Gael. *pìc*, a pike: W. *pig*, a point, a pike: Bret. *bek*, a beak, a point; *beked*, a pike-fish; *pik*, a pickax: comp. F. *pique*, a pike or pointed pole: L. *spica*, a point]: a kind of spear or lance head sharpened and mounted on a staff or pole, formerly used by foot-soldiers. Previously to the use of the bayonet, infantry of the line of battle—that is, the heavy-armed troops—were from earliest times armed with pikes or spears. The Macedonians carried pikes 24 ft. long; those of more modern warfare averaged 12 or 14 ft. They were of stout wood, tipped with a flat iron spearhead, which sometimes had cutting edges. As a defense against cavalry, the pike, from its length and rigidity, was of great value; but though it long survived the introduction of gunpowder, that event was really fatal to it. For success with the pike, especially in offensive war, a depth of several men was essential, and this depth rendered the fire of artillery peculiarly fatal. The pike is now superseded by the bayonet on the end of the musket.—*Pike* is the name also of a voracious fresh-water fish—so called from its pointed snout or lower jaw (see below): also of an iron spring on a lathe: a pitchfork. PIKED, a. *pīkt*, furnished with sharp iron ends or points. PIKEMAN, a soldier armed with a pike. PIKE-STAFF, the pole or shaft of a pike.

PIKE (*Esox*): genus of malacopterous fishes, including all the species of the family *Escocidæ*, as restricted by Müller, and characterized by an elongated body, covered with scales, a depressed head, and broad blunt muzzle, with very large mouth, abundantly furnished with teeth of various sizes on the jaws, palatine bones, and vomer; no adipose fin; and the dorsal fin placed very far back over the anal fin. The species are not numerous; all are inhabitants of fresh waters in the n. hemisphere. Only one is found in Europe, the COMMON P. (*E. lucius*), native also of Asia and N. America. It is very generally diffused over Europe, and abundant even in far northern Europe. It is very plentiful in all parts of the British Islands. It is supposed not to be truly indigenous to them; but the statement often made, that it was introduced in the reign of Henry VIII., is certainly erroneous, as there is evidence of its existence in England much earlier. Edward I., graciously regulating the price of commodities for his subjects, fixed the price of the P. higher than that of the salmon, and ten times higher then that of the turbot and the cod; from which we may infer its comparative rarity at that period. Some waters in fenny districts of England are peculiarly adapted to P., which are there found in very great quantity, and of superior quality.

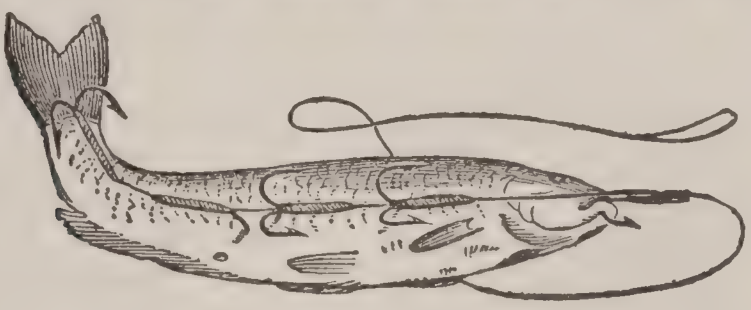
The P. is of dusky olive-brown color on the upper parts, becoming lighter and mottled with green and yellow on the sides, and passing into silvery white on the belly; fins brown; larger fins mottled with white, yellow, and dark green; tail-fin forked. The P. grows to a large size, occasionally attaining a weight of 60 or 70 lbs., though the stories of pikes much larger than this are liable to suspicion. The excessive voracity of the P. has long been proverbial. No animal substance which it can swallow, and which is capable of being digested, seems unpalatable to it; and no animal large enough to attract its attention, and which it can master, escapes being devoured. Mr. Jesse mentions an instance of eight pike, of about five lbs. weight each, consuming nearly 800 gudgeons in three weeks; and one of them devoured four roach, each about four inches in length, in rapid succession, and seized the fifth, but kept it in his mouth for about a quarter of an hour before swallowing it. The P. readily attacks a fish of its own size, and preys freely on the smaller of its own species. Frogs are frequent prey; water-rats and ducklings are sometimes devoured. A large P. often takes possession of a particular hole in the bank of a river, from which it issues to seize any passing prey.—The P. spawns in the beginning of spring, for that purpose ascending narrow creeks and ditches, in which it is very easily caught by nets. Large quantities are caught at the spawning season in Lapland, and dried for future use. The P. grows very rapidly when the supply of food is abundant, reaching a length of 8 to 10 inches in its first year, 12 to 14 in the second, 18 to 20 in the third, and afterward increasing for a number of years at the rate of about four lbs. every year. A young P. is called sometimes a *Jack* or *Pickerel*. The name *Luce* (Lat. *lucius*) is still known as an English name of the P. The Scotch name is *Gedd*, similar to the names in the Scandinavian languages.



Pike, or Jack (*Esox lucius*).

The flesh of the P. is much esteemed; but that of pikes of moderate size is reckoned the best.

The P. is caught not only by nets, but also by the rod, by set lines, and by *trimmers* or *liggers*, which may be briefly described as floats with lines so attached that the bait swims at a proper depth, and that some yards of line run out when the bait is taken. The floats are sometimes of wood or cord, sometimes of bundles of rushes, sometimes of bottles. In angling for P., various baits are used, e.g., a minnow, parr, or other small fish, a portion of a fish, etc.; sometimes an artificial fly is employed with great success, made of two large hooks tied together and adorned with two *moons* from a peacock's tail. The angler unaccustomed to the P. must be cautioned as to the manner of taking the hook from its mouth, as any rashness may lead to severe laceration of the hand by its teeth. P. may be fished any time from May to Feb. inclusive, except when there is actual freezing. Nov. is considered the best month; the P. are then in best condition. One of the most approved tackles for angling for the P. is the *Spinner*, baited with a small dace, bleak, gudgeon, or parr of about two ounces, as represented in the figure above. The mode of using it is thus described in Bailey's *Angler's Instructor:* 'Having cast your bait as far as possible, allow it, if you are fishing in a pond, or lake, or deep water, to sink a little, say two ft., then wind away at a brisk rate, holding your rod on one side rather low; if no run, wind out and throw again, but this time wind brisk four or five yards, then all of a sudden stop a moment, then off again, doing so three or four times in one cast. I have often found this a good plan. If you still have no run, try another throw and wind brisk as before, but occasionally giving your rod a sharp but short twitch.' See also Stonehenge's *British Rural Sports* (London 1875).



Pike Spinner.

Other species of P. are found in the lakes and rivers of N. America, as *Esox estor*, which is sprinkled with round blackish spots; and *E. reticularis*, which is marked with a network of brownish lines; it is the Common Pickerel of the United States. (See PICKEREL.) Much confusion exists in common names of fishes. In some U. S. localities, the Pike-Perches (q.v.) are called Pike.—Other N. Amer. species of *Esox* are the Brook Pickerels: *E. Americanus*, e. of the Alleghanies; *E. umbrosus*, in the Mississippi basin; neither much over 1 ft. long.—The MASKALLONGE (Fr., *masque allongé*, long face) or Muskelunge (*E. nobilior*) is the king of P., measuring 4–6 ft.; it has cheeks without scales, and is dark gray, with round black spots; it is found, though not abundantly, in all the great lakes of N. Amer.

The Garfish (q.v.) is called sometimes the Sea Pike. The same name is given also to certain large voracious fishes of warm seas, belonging to the perch family.—For the Saury P., see that title.

PIKE, *pīk*, ALBERT: 1809, Dec. 29—1891, Apr. 2; b. Boston. He studied at Harvard College, taught at Newburyport, and went to New Mex., then an almost unexplored region, walking several hundred miles of the way. After serving as a clerk at Santa Fé, he made his way, through great hardships, to Fort Smith, Ark., where he engaged in journalism and studied law. He served in the Mexican war; made treaties with the Indians, and was brig.gen. commanding the Indian allies of the Confederacy during the civil war. He was editor of the *Memphis Appeal* 1867, but the following year removed to Washington where he practiced law till 1880. In early life he won repute as a poet and a prose writer. He was a noted Freemason, and became not only the highest officer of the fraternity in the United States but 'the ranking Masonic dignitary of the world.' Among his books are *Prose Sketches and Poems* (1834); *Law Reports*, 5 vols.; *Nugæ* (poems); and 25 vols. of Masonic works.

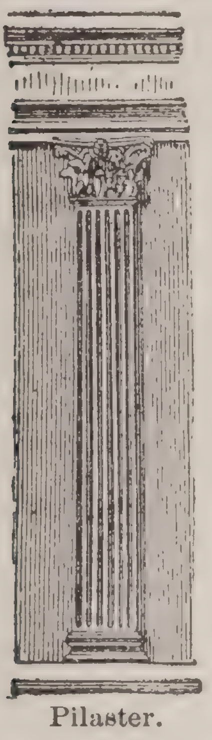
PIKE, ZEBULON MONTGOMERY: 1779, Jan. 5—1813, Apr. 27; b. Lamberton, N. J. He studied at Easton, Penn., to which place his father had removed, became an ensign in the army 1799, and by promotions reached the rank of capt. 1806. He continued his studies during the early years of his army service, and was engaged in explorations concerning the source of the Mississippi river and discovered Pike's Peak. In 1813 he commanded an expedition against York, since called Toronto, Canada. A landing was effected and one of the defenses was captured, but while arranging for an attack on another point, P. was injured by the explosion of a powder magazine and died in a few hours. For his early exploring services he had received the thanks of the govt., and he had been rapidly promoted through the various milit. grades till he reached that of brig.-gen., 1813, Mar. 12. He published (1810) a history of the explorations which he had conducted in the then newly acquired Louisiana territory.

PIKE-PERCH (*Lucioperca*): genus of fishes of the perch family; having two dorsal fins, of which the first has strong spiny rays; but resembling the pike in its elongated form, large mouth, and formidable teeth. The muzzle is not, however, broad and depressed, as in the pike. Several species are known, of which one (*L. sandra*) is common in the Danube, and in most rivers and lakes of n.e. Europe, extending w. to the Oder and the Elbe, though not found in Italy, France, or Britain. It is highly esteemed for the table. Salted and smoked it is a considerable article of trade in parts of Europe. It is a fish of rapid growth, and attains a weight of 25 or 30 lbs. This fish readily takes the minnow and the artificial fly. It is called *Sander*, *Sandel*, or *Sandat*, in parts of Germany; *Nagmaul* in Bavaria; and *Schill* at Vienna.—Another species (*L. Americana*), much resembling it, of greenish-yellow color, is found in the lakes and rivers of N. America. The American Wall-eyed P.-P. is known as Pike, or Yellow or Blue Pike; and a fish of the same genus (*Stizotedium canadense*) is called the Gray, or Sand, or Ground Pike, and even Pickerel.

PIKE'S PEAK: peak of the Rocky Mountains, in Colorado, 75 m. s. of Denver (q.v.), discovered by Gen. Pike, U.S.A., 1806. Its height is 14,151 ft., and it commands a view, of 100 m. radius, of a rugged, mountainous country, containing many lakes, and the sources of four great rivers—the Platte, Arkansas, Rio Grande, and Colorado of California. In 1858 large deposits of gold were discovered here; and during the first four years after the discovery, there were shipped more than $30,000,000 in gold. It abounds in rich gold-bearing quartz.

The mining country is 5,000 ft. above the sea, with a dry climate. An important high-level observatory, meteorological and astronomical, has been established near the summit.

PILASTER, n. *pĭ-lăs′tėr* [F. *pilastre*—from It. *pilastro*, a pilaster—from L. *pila*, a pillar]: in classical architecture, a square pillar, sometimes standing free, but usually attached to a wall, from which it projects $\frac{1}{5}$, $\frac{1}{4}$, or other definite proportion of its breadth. Greek pilasters, or antæ, were of the same breadth from top to bottom, and had different capitals and bases from those of the orders with which they were associated. The Romans gave them a taper like the columns, and the same capitals and bases. PILASTERED, a. *pĭ-lăs′tėrd*, furnished with pilasters.


Pilaster.

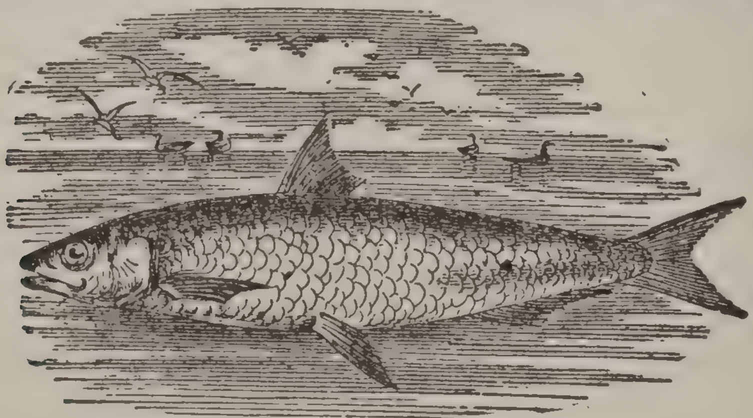
PILATE, *pī′lat*, PONTIUS (PONTIUS PILATUS): procurator, or Roman gov. of Judæa A.D. 26–36. Besides his relation to the crucifixion of Jesus Christ, very little is known of the life of P. He was of equestrian rank and was indebted for his promotion to high office to Sejanus, Tiberius's prime minister. His residence as gov. of Judæa was at Cæsarea. The occasion of his being deposed from office, A.D. 36, was a complaint brought to Vitellius, the Legate of Syria, that P. had caused an assembly of Samaritans on Mt. Gerizim to be attacked and massacred.—P.'s wife is known to tradition under the name of Procla, or Claudia Procula; in the Greek Chh. she is venerated as a saint, her festival occurring Oct. 27.

In previous centuries, the character of P. was regarded from points of view so very different that by some he was made little less than a demon, and by others was even sainted. It is now generally agreed that he was simply an example of the selfish worldly type of office-holder, with something of a Roman sense of public justice, and, as a Roman, looking with the impartiality of indifference on Jewish ideas and prejudices. There is no reason to impute humane motives to one who had not hesitated in his previous career to resort to severe measures without scruple. Nor is there any ground for representing P. as a man of weak, vacillating temper; his previous acts do not sustain such an interpretation, and the gospels record only his repeated efforts to save his own popularity and tenure of office (threatened by the Jews), while he sought to set free a prisoner innocent, in his view, of crime, or, at least, to shift the responsibility upon Herod Antipas. He was a politician. Once, in the course of the procedures, he resorted to a compromise—that of scourging. His selfishness finally carried the day, and gave him forever a bad eminence. The washing of his hands was rather a not rare mode of disavowal of responsibility than an act of compunction. His question 'What is truth?' showed his entire blindness to the true character of the august being whom he delivered over to the vengeance of the Jews. His fear, when the Jews accused Jesus of making himself the Son of God, need not be interpreted as anything more than the superstitious belief of a heathen in 'gods many,' and in their occasional appearances among men—a superstitious feeling that may have been awakened by his wife's warning dream. The final cunning reference to P.'s loyalty to Cæsar, appealing to selfish fear, turned the scale: 'When Pilate therefore heard that saying, he brought Jesus forth, and sat down in the judgment seat.'

PILAU, or PILAW, *pĭ-law':* a dish common in India, Turkey, Egypt, and Syria, consisting generally of rice, but occasionally some animal food is added. The correct method of preparing it is to boil the rice 20 minutes, with sufficient water to soak it thoroughly, and swell the grains to their utmost, taking care not to break them by making them too soft; it is then drained, and gently stirred with butter, pepper, and finely-chopped onions, and served up. For the tables of the more wealthy, fowls, lamb, mutton, shreds of ham or bacon, variously cooked, but always much boiled or roasted, are placed on top of the rice and served with it. In India, very numerous and elaborate receipts are in use.

PILCH, n. *pĭlch* or *pĭlsh* [It. *pelliccia;* F. *pelisse*, a furred cloak; AS. *pylce*, a furred garment; Gael, *peallag*, a mat, a skin (see PELISSE and PELT 3)]: a gown lined with fur; a piece of flannel to be wrapped about a child. PILCHER, n. *pĭlsh'er*, in *O.E.*, a buff or leathern jerkin; the leather sheath of a sword; in *slang*, a stealer; a thief.

PILCHARD, n. *pĭlch'erd* [probably of Celtic origin; comp. Ir. *pilseir*, a pilchard; Ir. *pelog*, Gael. *peiug*, a porpoise; W. *pilcod, minnows*], (*Clupea pilchardus*, or *Albusa pilchardus*); important sea-fish of family *Clupeidae* (q.v.), referred by some naturalists to the same genus with the Herring (*Clupea*), and by others to the same genus with the shad (*Alausa*). The P. is nearly



Pilchard (*Clupea pilchardus*).

equal in size to the herring, but rather thicker, and the lines of the back and belly are straighter; the scales are larger and fewer; and the dorsal fin is rather further forward. The mouth is small, and in the adult fish destitute of teeth; the under jaw longer than the upper. The upper part of the body is bluish-green; the sides and belly silvery white; the cheeks and gill-covers tinged with golden yellow, and marked with radiating striæ; the dorsal fin and tail dusky. The P. is an inhabitant of more southern seas than the herring. The P. is found off the coasts of Ireland, France, Spain, and Portugal; and it is less plentiful than formerly on the coasts of Devon and Cornwall. Like the herring, it was formerly supposed to be migratory; but, as in the case of the herring, this opinion has been relinquished; and the shoals of pilchards seen on the coasts are believed merely to issue from deeper waters near, for the purpose of spawning. The spawning season begins early in summer; but on the coasts of Devon and Cornwall, the principal fishery is in Aug. and Sep. Pilchards are caught either with drift-nets or seine-nets, principally with seine-nets. By means of one or more seines, each 360 ft. long and 36 ft. deep, a shoal is inclosed; the bottom of the net is then drawn together by a peculiar contrivance, and the pilchards are taken out at low water by small bag-nets. Prodigious numbers are sometimes inclosed in a single seine. More than 24 millions are said to have been taken at once from a single shoal, which, however, may have been spread over several sq. miles. The approach of a shoal is known by the rippling of the water, and the sea-birds hovering above, and is often watched for and marked from the shore. In some years the quantity taken in the P. fishery on the English coast is enormous, and the capital invested in it in Devon and Cornwall is probably not much under £1,000,000, Great quantities of pilchards are annually exported to the W. Indies and elsewhere. Those for exportation are pickled, and packed in barrels under great pressure, by which oil is expressed to the amount of three or four gallons from a hogshead of fish. The oil, with the blood and pickle with which it is mingled, is generally used for manure. A favorite Devonshire dish is a pie of pilchards, with their heads protruding from the crust. It is now generally admitted that the P. and the sardine are identical, and pilchards have been prepared like sardines, in oil. It is said that the Cornish sardines cannot be distinguished from those imported from France. —A great number of boats are employed in the P. fishery in and near the estuary of the Tagus. The P. is known in Scotland as the *Gypsy Herring*.

PILCOMAYO, *pĭl-kō-mī'ō :* river of S. America, whose course has not as yet been thoroughly explored, drawing its waters from the Bolivian Andes, and formed by confluence of two rivers, the Suipacha and the Pilaya. Of these head-waters, the south one, the Suipacha, rises in the mountains immediately s. of Potosi; while the n. affluent, the Pilaya, drains the valleys around Chuquisaca. These streams unite in lat. about 21° 35′ s., to form the P., which flows s.e., crosses the Bolivian frontier, waters the n.e. region of the Argentine Confederation, and falls into the Paraguay a few m. below Asuncion. It is at least 1,200 m. in length; but its waters are much spent in lagunes on its course, so that it adds no great volume to the Paraguay. It is navigable about 500 m.; but hordes of hostile Indians render navigation perilous. Before entering the Paraguay, it divides into two arms, of which the n. is called Araguay-Guaso; and the s., again dividing into two branches, the Araguay-Mino. The mouths of the P. are narrow, deep, and much obstructed by water-plants.

PILE, n. *pīl* [F. *pile*, a ball to play with, a heap—from L. *pĭla*, a ball or globe: Dut. *pijl*, a heap]: a large building or mass of buildings; a heap of a roundish elevated form; a heap; an accumulation: V. to collect or gather together in a heap or mass; to accumulate; to fill above the brim or top. Pil'ing, imp.: N. the act of making into a heap by placing one above another; the act of reheating iron blooms or slabs for further working. Piled, pp. *pīld.* Funeral pile, *anc.*, a collection of combustible material for consuming a dead body. Voltaic or Galvanic pile, a series of plates of copper and zinc laid one above the other alternately, with cloth or paper placed between each pair, moistened with an acid solution, for producing a current of electricity. Piles, n. plu. *pīlz*, a disease of the veins at the extremity of the rectum (see below).

PILE, n. *pīl* [L. *pilus*, hair: F. *poil*, hair, nap]: a short, thick, hairy surface; nap.

PILE, n. *pīl'* [L. *pīla*, a pillar, a pier of stone: It. *pila:* W. *pill*, the stem or stock of a tree]: a large stake or piece of timber, or (iron pile) an iron cylinder, driven into the earth to support the foundation of a building or the pier of a bridge. Piles are usually squared logs of wood used in engineering operations, such as dams, bridges, roads, etc. They are sharpened at the point, and, if necessary, protected with iron points, to enable them to cut through the strata which they encounter as they are driven into the ground. When used for coffer-dams, or such temporary purposes, they are placed close together, and driven firmly into the earth; the water is then pumped out, and the piles form a dam, to enable workmen to lay foundations of piers, etc. When the force of the water round the dam is great, two rows of piles are driven in all round, and the space between the rows filled with clay, and puddled. Piles are used also for permanent works, when they are driven through loose soil till they reach a firm bottom, and thus form a foundation on which buildings, roads, etc., may be placed. Cast-iron is frequently used for piles, which are cast hollow. Wharf-walls are sometimes of piles; they are then cast with grooves on the sides, into which cast-iron plates (forming the walls) are fitted. A kind of pile of great use in loose and shifting substances is the screw-pile, and consists of a long shaft (of wrought-iron), with a broad cast-iron disk, of screw form at the lower end. These piles are useful especially where light-houses, beacons, etc., have to be placed on sands. They are fixed by means of capstans, which give them a rotatory motion. Common piles are driven in by machines called *pile drivers,* in which a heavy weight (or monkey) is raised to a considerable height between two guides, and then let fall on the head of the pile. The application of steam to these drivers has made them very powerful engines—Nasmyth's steam-hammer being a well-known instance. In 1843 a kind of pile was introduced which consists of hollow tubes of iron, from which the sand, etc., within them is removed by an air-pump, and the pipes are then sunk. In recent railway bridges, cylinders have been much used to form both piles and piers. They are of cast-iron, and made in pieces (each about 6 ft. in height), applied one on top of another. The sand or gravel is removed from the inside of the first laid, which thus sinks down; another cylinder is placed above it, and the same process continued till it also has sunk sufficiently; and so on, cylinder over cylinder, till a solid foundation is reached. The requisite number of cylinders is then piled up to form the pier above ground.—*Pile* is also the name given to one side of a coin—so called from the punch used in stamping the figures; the arms side of a coin, as distinguished from the head, which was formerly marked by a cross: in *her.* (see below): V. to drive piles into. PI'LING, imp.: N. the act of driving in piles; a series of piles; piles collectively, as the piling of a bridge. PILED, pp. *pild.* SHEET-PILING, a series of piles of planks driven edge to edge. PILE-BRIDGE, bridge whose piers are built with piles. These may be either temporary wooden structures, in which wooden piles, driven into the ground, serve also as piers, or they may be permanent bridges, with iron cylinders forming the piles below the surface, and piers above. PILE-DWELLINGS: see LAKE-DWELLINGS: PFAHLBAUTEN. PILE-ENGINE, or PILE-DRIVER, an engine for driving in piles. PILE-WORK, houses or erections on a foundation of piles amidst water. CROSS AND PILE, in *OE.*, equal to modern phrase 'head and tail'; a piece of money with a cross on one side, the opposite side being called the *pile.*

PILE, *pīl,* in Heraldry: an ordinary, or, according to some heralds, a subordinary, in form of a wedge, issuing usually from the middle chief, and extending toward the middle base of the shield. A pile *transposed* is one whose point is upward.

PILEATE, a. *pī′lĭ-āt*, or Pi′leated [L. *pilĕātus*—from *pilĕus*, a close-fitting felt cap]: in *bot.*, having a cap like the head of a mushroom. Pileiform, a. *pī′lĭ-fawrm* [L. *forma*, shape]: resembling a hat or cap. Pileus, n. *pī′lĕ-ŭs*, in *bot.*, the cap-like portion of the mushroom bearing the hymenium on its under side; in *Rom. antiq.*, a felt cap or hat; a skull-cap worn by the Romans.

PILEORHIZA, n. *pī′lĕ-ō-rī′ză* [Gr. *pilĕŏs*, a cap; *rhiza*, a root]: in *bot* , a covering of the root; a cap found at the end of all true roots.

PILES, *pīlz*, or Hemorrhoids, *hĕm′ŏr-royds:* small tumors either within or on the verge of the anus. They consist of folds of mucous and sub-mucous membrane in an inflamed, infiltrated, or permanently thickened condition, and usually contain enlarged veins. There are several varieties of these tumors. Sometimes the pile is composed mainly of a little knot of varicose veins in the sub-mucous tissue; in this case, it is readily emptied, by pressure, of the fluid blood contained in it, which, however, returns when the pressure is removed. Sometimes the blood in a dilated vein coagulates, forming a solid tumor surrounded by tissues, thickened in consequence of inflammation; or the tumor may consist of a kind of erectile tissue formed by an abnormal condition of the vessels of the mucous membrane; this variety is especially liable to bleed. These tumors are divided into *bleeding* and *blind* piles, according as they are or are not accompanied with hemorrhage; and into *internal* and *external* piles, according as they are within or without the sphincter muscle of the anus.

The following are the general symptoms of this affection: The patient, after having experienced for a varying time a feeling of heat, fulness, and dull pain about the lower part of the bowel, becomes conscious of a sensation as if there were a foreign body in the anus; and on examination after an evacuation, discovers a small tumor, usually about the size of a grape, which either remains outside, or is retracted, according as it originated without or within the sphincter. This tumor gradually increases, and others form around it, until a mass at length results as large as a pigeon's egg, or larger. In its ordinary *indolent* state the tumor has little sensibility, and occasions comparatively little annoyance; but when it is *inflamed* (from strangulation of the sphincter muscle, or from any other cause), it is exquisitely tender to the touch, and is the seat of burning and stinging sensations, rendering the evacuation of the bowels (and sometimes of the bladder also) difficult and painful. In women, an inflamed pile may cause pain in the back, irritation of the womb, with mucous discharge, and many other anomalous symptoms. In severe cases, the patient can neither stand nor sit with comfort, and finds relief only in the horizontal position.

Piles may be caused by any circumstances which cause congestion in the lower bowel, such as luxurious and sedentary habits, pregnancy, and such diseases of the liver as tend to check the return of blood from the veins of the rectum. Moreover, anything that causes irritation of the rectum, such as acrid purgatives, especially aloes;—also dysentery, inflammation of the prostate gland, etc., may cause piles. But of all causes, constipation is probably the most frequent; it operates in producing them partly by pressure of the accumulated and hardened fæces on the veins carrying the blood away from the rectum, partly by the straining and irritation which such fæces occasion during their evacuation.

In the treatment of piles, it is expedient to relieve the congested state of the lower bowel by one or two doses of sulphate of magnesia, and a cooling vegetable diet; after which the continued use of mild laxatives should be resorted to. Far the best time for the bowels of patients of this kind to act is about bed-time, as the parts irritated by the passage of the evacuation become quieted during the night. In long-standing cases, in which there is general relaxation of the mucous membrane, professional advice should be had as to the medicines appropriate; and such advice, early secured, may prevent the chronic character of the disease. Among milder forms of local treatment are: (1) injection of the rectum with cold water both before and after the motion; (2) washing the anus with cold water or yellow soap and cold water after every evacuation. (3) application of gall ointment or of other astringents; (4) injection of astringent lotions, e.g., sulphate of iron, in the proportion of a grain to an ounce of water. If these fail, recourse may be had, indispensably under surgical or medical attendance, to pressure by means of instruments specially devised for the purpose; to application of strong nitric acid, which, in the case of internal piles, affords the most speedy and effective means of relief (if the parts cannot be protruded, the acid must be applied through the speculum); to ligature; or, in the case of external piles, to excision. When the piles are inflamed, leeches to the anus (not directly to the tumors) are sometimes required; but the inflammation generally subsides under the influence of rest in the horizontal position, fomentations, poultices, and low diet.

If the hemorrhage or bleeding that frequently accompanies piles is moderate in quantity, and has continued some time without inducing weakness or any other bad symptom, it is not usually expedient to interfere with it. When, however, it obviously requires checking, the effect of cold water injected into the rectum, as above recommended, should be tried; and, in case of its failing, recourse should be had to astringent injections. At the same time, the patient should remain in a horizontal position, and take the medicines usually prescribed for internal hemorrhage. In rare cases, it is necessary to tie a vessel, or to touch it with a red-hot wire (through the speculum), or to plug the anus.

PI'LEUS: see FUNGI.

PILE'WORT: see RANUNCULUS.

PILFER, v. *pĭl'fėr* [OF. *pelfre*, goods taken by force; *pelfrer*, to plunder: L. *pilārĕ;* It. *pelare*, to fleece: Sp. *pelar:* F. *piller*]: to steal, applied to petty thefts; to filch. PIL'FERING, imp.: ADJ. practicing petty thefts: N. petty thefts. PIL'FERED, pp. *-fėrd.* PIL'FERER, n. *-ėr*, one who pilfers. PIL'FERINGLY, ad. *-lĭ.* PIL'FERY, n. *-ĭ*, petty theft.

PILGARLIC, or PILL-GARLIC, n. *pĭl-gâr'lĭk* [Gael. *peall*, a skin; *galar*, a disease]: in *OE.*, one whose hair has fallen off, or skin peeled off from disease; a poor sneaking creature. *Note.*—Others say the term is *pilled-garlic*, meaning one who *peels garlic* for others to eat, an occupation assigned to a class who endured hardships and ill-usage.

PILGRIM, n. *pĭl'grĭm* [It. *pellegrino;* Sp. *peregrino;* Ger. *pilger;* F. *pèlerin*, a pilgrim: L. *peregrīnus*, a foreigner, in mid. L. a pilgrim—from L. *per*, through; *ager*, a territory or district]: wanderer; traveller to a distance to visit a holy place, or a place sacred from its associations (see below). In *Scrip.*, applied to the true Christian, as one whose home is in the better country. PILGRIMAGE, n. *pĭl'grĭm-āj*, a journey to a distant place for a devotional purpose; a tour; an excursion; in *Scrip.*, the journey of life.

PIL'GRIM: one who visits, with religious intent, some place reputed to possess especial holiness; or who goes forth to strange lands under religious motives. The early Christians, like the Jews and the pagan Gentiles, regarded certain places with special religious interest; above all, the Holy Land, particularly the scenes of the Passion of our Lord at Jerusalem. St. Jerome (Ep. xliv.) refers the practice of visiting Jerusalem to the discovery of the Holy Cross by St. Helena. He himself was a zealous pilgrim; and throughout the 4th, 5th, and 6th c. pilgrims habitually undertook the long and perilous journey to the Holy Land from almost every part of the West. Other sacred places, too, were deemed fit objects of like visits of religious veneration. The tombs of the apostles Peter and Paul, and of the martyrs in the catacombs at Rome, are so described by St. Jerome (*Commentar. in Ezekiel*). St. Basil speaks in the same terms of the tomb of the Forty Martyrs; and the historian Theodoret tells of not only visiting such sanctuaries, but of hanging up therein, as offerings, gold and silver ornaments, and even models of hands, feet, eyes, etc., in commemoration of the cures of diseases supernaturally obtained by these pious visits. The PILGRIMAGE, however, pre-eminently so called, was that of the Holy Land; and even after Jerusalem had been occupied by the Saracens, the liberty of pilgrimage, on payment of a tax, was formally secured by treaty; and it was from the necessity of protecting pilgrims from outrage that the well-known MILITARY ORDERS (q.v.) had their origin. The CRUSADES (q.v.) may be regarded as a pilgrimage on a great scale; the direct object being to secure for the Latin Christians immunity of pilgrimage. On the other hand, the final abandonment of the Crusades led to a great extension of what may be called domestic pilgrimage, and drew into religious notice and veneration many shrines in Europe, which, after the lapse of time, became celebrated places of pious resort. The chief places of pilgrimage in the West were: in Italy—Rome, Loreto (q.v.), Genetsano, Assisi; in Spain—Compostella, Guadalupe, Montserrat; in France—Fourvières, Puy, St. Denis; in Germany—Oetting, Zell, Cologne, Trier, Einsiedeln; in England—Walsingham, Canterbury, and many others of minor note. The pilgrim commonly bound himself by only a temporary vow (differing in this from the permanent vow of the Palmer, q.v.), and which terminated with the actual visit to the place of pilgrimage, or at least with the return home, and by which he was bound for the time to chastity and to certain other ascetic observances. The costume consisted of a black or gray gabardine, girt with a cincture, from which a shell and scrip were suspended, a broad hat, ornamented with scallop-shells, and a long staff. Many abuses arose out of these pilgrimages, the popular notions regarding which may be gathered—though, probably, with a dash of caricature—from Chaucer's *Canterbury Tales.* Pilgrimages, which have always been in vogue in Italy, Spain, southern Germany, and Switzerland, had gone much into disuse in France during and since the Revolution; but in late years pilgrims have resorted in large numbers, not only to the ancient sanctuaries of Notre Dame de la Garde, de Fourvières, de Puy, etc., but also to La Salette, Lourdes, Paray-le-Monial, and Pontigny. In 1873 and 4 organized parties of pilgrims on a very large scale from France, Belgium, England, the United States, etc., visited the sanctuary of Paray-le-Monial, the place at which the vision of Marie Alacoque, which gave rise to the devotion to the Sacred Heart of Jesus (q.v.), is recorded to have taken place. In 1874 English pilgrims to the number of 500 visited Pontigny. Numerous pilgrimages have been held in Belgium also.

PILGRIM FATHERS, The: first English settlers at Plymouth on the coast of Cape Cod Bay; earliest pioneers of permanent settlement in New England; forming the Plymouth Colony, known as the Old Colony; but ultimately (1692) merged with the Massachusetts Colony, which bordered it on the n. toward Boston harbor. Very early custom marked as old comers or forefathers the three several parties who came, 100 on the *Mayflower*, 1620; 35 on the *Fortune*, 1621, Nov. 9; and about 60 on the *Anne* and the *Little James* 1623, Aug. 1; these three companies representing, but with some additions, a special body of English people who had gone out of England 1608 to Amsterdam in Holland, and since 1609 had lived at Leyden, in Holland, organized as a church on a liberal basis of evangelical faith and ecclesiastical independency nowhere else known. This church had sprung up at Scrooby in Nottinghamshire, close to Austerfield in Yorkshire, in connection with a kindred church 9 m. e. at Gainsborough, which had somewhat earlier organized secret exercise of worship apart from the established church of England. Such worship, forbidden by law under the penalties of sedition, and punished in several cases already by severe imprisonment and death, was desired and made a matter of conscience by a small class among the Puritans, who objected to state control of religion, to church organization on any basis except that of the local union or fellowship of Christ's true spiritual disciples, and to any imposition of forms in public worship by civil or ecclesiastical law, and to any restriction on entire freedom of study of Holy Scripture and of practice according to its precepts. The great body of Puritans, while equally desiring true religion, and some reforms in church order and worship, were strongly in favor of control of religion by law, and of belief and worship enacted and enforced. This great majority of Puritans joined in stigmatizing as 'Separatists,' and as guilty of 'schism' that class (at Scrooby, afterward at Leyden and Plymouth), whose principle was that of freely exercising the worship of God among themselves, without control from any, or any imposition of beliefs, forms, methods of organization, or of activity. The church Puritans and the non-church Puritans were thus opposed on English ground; and the latter had to flee as exiles for Christian liberty; while the former could stay in hope of themselves gaining power in the church, and thereby having their own way of control by law, of enacted and enforced faith and worship, and of church and social order strictly imposed. The 21,000 Puritans of this latter type, who came over 1628–40, and mainly settled New England, had little original affinity, on the ground of complete freedom of worship, with the Separatist Puritans (to whom indeed the name Puritans can scarcely with propriety be applied) from whom the Pilgrim Fathers came. Much, in fact, of the troubles of the latter were due to the antipathy of church-and-party Puritans toward non-church free Puritans, such as the Pilgrims were.

Queen Elizabeth's execution of the sentence of death on Mary Queen of Scots set in motion the course of events which brought the Pilgrims to these shores. To appear to clear herself in the matter she discarded Sec. Davison; and this broke off the career at court of William Brewster, and sent him to Scrooby, to take charge of the govt. post, whose offices were in an old palace of the abp. of York. Brewster gathered and gave shelter to the Scrooby church of radical Puritans; and was its stay and leader then and later, together with a non-church Puritan minister, John Robinson, who became the famous Pilgrim pastor. A notable third man, also of rare type, was William Bradford, who served 31 years of the period 1621–57 as gov. of Plymouth Colony, and who, 1630–50 set down the Pilgrim history (1603–46) in annals which show many a rare touch, and tell one of the great stories of the world. The Scrooby company were a gathered church 1606, in great peril, if their weekly exercise of free non-church worship was discovered, and in the autumn of 1607 they made an attempt to go into exile by ship from Boston, England, but the ship-master betrayed them to the constables, who harried them savagely, haled them to prison, and only after this barbarous treatment left them to return to their abandoned homes. The next spring, 1608, they contrived to escape from England from a lonely seashore common near the mouth of the Humber, between Grimsby and Hull; and with many mishaps and hardships, from the constables attacking them and the sea almost overwhelming them, finally came together at Amsterdam about the end of summer. The Gainsborough non-church company had reached Amsterdam a year or two earlier, with the notable John Smyth as their minister; and earlier still a considerable congregation under Francis Johnson and Henry Ainsworth had become established there. These Smyth and Johnson peoples held their non-church views rigidly, used harsh judgment toward both Romanists and English Episcopalians; and were narrow and contentious even among themselves on differences of no great moment. The temper, ideas, and habit of Robinson and Brewster, and those under them, were the contrary of all this—wholly liberal and charitable, tolerant and broad, judging kindly of Romanists even, and owning the English church as their own by birthright and much grateful memory, however bound they were to 'separate' for more perfect spiritual culture. The one class of non-church 'Separatists' followed the views and spirit of Robert Browne, and were known as Brownists or Rigid Separatists: the other class were represented by Robinson, Brewster, and the Pilgrim church. So marked did the contrast become after the removal 1609 of the Pilgrim church from Amsterdam to Leyden, that Edward Winslow, who joined them there, relates that 'the Brownists at Amsterdam would hardly hold communion with the people at Leyden.' The removal to Leyden was made after a year at Amsterdam because Robinson and Brewster foresaw the course of rigor and contentious narrowness threatened by the Smyth and Johnson churches; and thought it best to sacrifice worldly interests, to which the great commercial seaport was more favorable, for the sake of the peace, love, and comfort in fellowship, which they might find in the university city. In due course John Smyth denounced Robinson's church as 'no better than its mother, the Church of England, and its grandmother, the Church of Rome;' while Robinson said, in protest against the more harsh Separatist views, 'God hath his people in Babylon. Neither is "the baptism in Rome a Babylonish washing," as they calumniate. Much less can that vitupery agree to the Church of England.' At the date of the plans of the Pilgrims for coming to America, one of them gave as a reason why the Amsterdam Separatists would not care to join in the expedition, 'Our liberty is to them as ratsbane, and their rigor is to us as the Spanish Inquisition.' The learned Puritan historian, Prince, specially complained that 'noted writers' made the 'great mistake' of classing Robinson with the rigid Separatists; when even so bitter an inveigher as Robert Baylie, commending him as 'the most learned, polished, and modest spirit that ever separated from the Church of England,' said that he 'ruined the Rigid Separation, was a chief overthrower of the Brownists, and became the author of Independency.'

During the 11 years' residence of the Pilgrims at Leyden, 1609–20, the Pilgrim minister, with three others, had a large house opposite the principal church; and around the margin of the ground belonging to it they built 21 cottages, thus bringing 25 families into very close social relations: other families had homes elsewhere in the city. The difficulty of living was so great that though many came to them, and they grew a great congregation, meeting in their pastor's house, not a few were forced by want to return to England, and some even preferred, Bradford says, to go back into English prisons rather than meet the hardships of liberty in Holland. The whole body were specially noted by the Dutch for their industry, strict integrity, peace, and quiet; and Robinson came to the very front of Dutch theology, surpassing the Dutch divines in coping in public discussion with the accomplished leaders of Arminianism, whom he put openly to an apparent non-plus, says Bradford, not alone by his great learning and rare skill in speech, but by the temper of charity, fairness, breadth, and liberality, in which he was in contrast with the Calvinists whose side he took, and was superior to even the broader-minded Arminians; his regular habit having been to hear the teaching of both sides, and to ever hold himself desirous of more light, from whatever quarter it might come. His theological writings are rich in expressions implying a broad-church liberalism, which led Prince to note that the Pilgrims 'renounced all attachment to any mere human systems or expositions of Scripture, and reserved an entire and perpetual liberty of searching the inspired records, and of forming both their principles and their practice from those discoveries they should make therein, without imposing them on others;' and also to note of Robinson that 'in that age of low and universal bigotry this truly great and learned man seems to be almost the only divine who was capable of rising in a noble freedom of thinking and practicing in religious matters.'

Being Calvinistic in doctrine, the Pilgrims were allowed liberty in Holland; but the Dutch Calvinism of the period, 1609–21, ran a course of violent intolerance and cruel persecution of non-Calvinists, ending with the infamous murder of Barneveldt, the imprisonment of the great scholar, Grotius, and the expulsion from office, and expatriation, of numbers of the best preachers and people of Holland. In general the Dutch let Robinson and his people severely alone; and even when the famous pastor had shown himself unequalled in his mastery of the current discussion, they had no favor which they dared grant, because they stood in fear of the English govt. Some favor extended by the university, some applause of Robinson's skill in Latin theological debate, and some recognition of his rare character, were all that the Dutch ever bestowed on the Pilgrim scholar, saint, and statesman.

The great hardness of Holland as a place to live in, the loss of English relation, the want of opportunity to educate their children or even to protect them from bad influences, the low ideas of the Dutch as to keeping the Sabbath, and the 'raging plague,' as Robinson called it, of Dutch disputes in doctrine, led the leaders of the Pilgrim church to consider that even savage America under English rule would be 'much better than Holland.' A plan was matured after extended consideration among themselves, and negotiations with the English govt. from which at best only very limited favor was secured. Some 70 persons in and about London joined in raising money to take stock in a colony, with a view to profits, as well as for the cause represented by the Pilgrims. These not only had in part a mercenary motive, but many of them were zealous church-Puritans, who allowed non-church people to risk their lives in breaking the ice for a colony, but as soon as that was done, opposed the going over of any more of the Leyden people; and in particular prevented Robinson from going, as he made every effort to do until his death, 1625, Mar. 1. These 70 stockholders were not of those who went; but they sent some colonists of non-Pilgrim character, a few of whom were an evil element even in the *Mayflower* company. The plan adopted was for a voyage to some part of the region owned by the Virginia Company. About the middle of July they were ready to set forth. Their story says: 'And the time being come that they must depart, they were accompanied with most of their brethren out of the city, unto a town sundry miles off, where the ship [*Speedwell*] lay ready to receive them. So they left the goodly and pleasant city, which had been their resting-place near 12 years; but they knew they were pilgrims, and looked not much on those things, but lift up their eyes to the heavens, their dearest country, and quieted their spirits.' Winslow said of this parting: 'I persuade myself that never people upon earth lived more lovingly together and parted more sweetly than we the church at Leyden did.' They went forth, as Bradford says, with 'a great hope and inward zeal of laying some good foundation, or at least to make some way thereunto; yea, though they should be but even as stepping-stones unto others for the performing of so great a work.' And 'the place they had thoughts on was some of those vast and unpeopled countries of America, being devoid of all civil inhabitants, where there are only savage and brutish men, which range up and down, little otherwise than the wild beasts of the same.' So, about 1621, July 22, nearly half of Robinson's church took ship at Delf Haven, on the *Speedwell*, and made a quick voyage to Southampton, where the *Mayflower* lay, with others of the intended colony, including some Leyden people who had been conducting matters in England, some English friends of like mind, and some strangers who were mere adventurers. It had been resolved at Leyden that Robinson should stay or go with the majority, and that Brewster, chosen as elder to the office of assistant minister, should lead the minority. Brewster was thus the minister, guide, and adviser of the Pilgrim band. A start was made about Aug. 5, with the two ships, but on account of trouble with the smaller ship a stop was made, Aug. 13–23, at Dartmouth, and on going thence to 'above 100 leagues without the Lands End,' more trouble caused a return to Plymouth, the giving up of the second ship, and reduction of the number to 102 persons besides the sailors, after which a final start was made, Sep. 6, for a voyage of 66 days, in which they 'met with many contrary winds and fierce storms,'—'boisterous storms in which they could bear no sail, but were forced to lie at hull many days together,'—and 'after long beating at sea' reached land, Nov. 9. Winslow says of the voyage: 'Being pestered nine weeks in this leaking, unwholesome ship, lying wet in their cabins, most of them grew very weak, and weary of the sea.' From the first land seen, north of Cape Cod, they sought 'to stand southward to find some place about Hudson's river, according to their first intentions,' but were forced to put back, and make a harbor, Nov. 11. 'This day,' says their record, 'before we came to harbor, observing some not well affected to unity and concord, but gave some appearance of faction, it was thought good there should be an association and agreement that we should combine together in one body, and to submit to such govt. and govs. as we should by common consent agree to make and choose.' A formal compact to this effect—a strong and simple model for the constitution of a self-governing civil state, the earliest framed in the new world and almost unique in history—was signed by 41 men, representing 100 persons (one of them an infant born at sea, where also one, a servant, had died). The office of first gov. was intrusted to John Carver, who had notably led in the earlier conduct of affairs, and was esteemed a goodly gentleman among them.

Arriving in harbor, as instantly as possible 15 or 16 men, well armed, landed, 'with some to fetch wood' for fires—no wood being left on the ship. This was Saturday; and Monday, Nov. 13, their shallop, which had been cut down to go between decks, and 'was much opened with the people's lying in her,' was unshipped for repairs, which took 16 or 17 days. Not waiting for this, 16 men well armed under Capt. Standish, a good soldier who had joined them in Holland, set out Nov. 15 for three days of exploration by land. The record of their outlook here is in these words: 'Being thus passed the vast ocean, which way so ever they turned their eye, save upward to the heavens, they could have little solace or content in respect of any outward objects. For summer being done, all things stared upon them with a weather-beaten face; and the whole country, full of woods, and thickets, presented a wild and savage hue. If they looked behind them, there was the mighty ocean which they had passed, and was now as a main bar and gulf to separate them from all the civil parts of the world.' The second effort of exploration was made with the shallop, in which about 24 men and 10 seamen made a coastwise trip in the last days of Nov. and first of Dec. Much foul weather then came, with no prospect yet of a place to land; and ten of the principal men, with six seamen, started Dec. 6 on another exploration up the coast. 'The weather,' says Bradford, 'was very cold; it froze so hard as the spray of the sea lighting on their coats, they were as if they had been glazed.' The second day some went by land and some by sea, meeting at night at a creek's mouth, where they built, as they did every night, a defense of logs, stakes, and pine boughs. The next morning, Dec. 8, they suffered their first attack from savages, almost a surprise, but came away in safety for a last terrible day on the wintry sea. The weather was foul, with snow and rain; about mid-afternoon the wind increased and the sea became very rough; their rudder was broken in the storm and two men with oars could hardly steer the shallop. The storm growing more violent and night drawing on, they bore what sail they could to get in somewhere while they could see. But now the mast was broken into three pieces, and the sail carried overboard, in a sea which ran so high that they were in peril of being cast away; only, the flood tide being with them, they recovered themselves and struck into what seemed a harbor, but proved a cove full of breakers, out of which they barely escaped by pulling about and rowing desperately through the extreme darkness and a raging sea, the rain beating furiously on them, until they struck under the lee of a shore where they could lie until day broke, Dec. 9, revealing the island in Plymouth harbor known later as Clark's Island. It was a fair sunshiny day, secure from savages, and a Saturday, permitting them to dry their clothing, to put in order their guns, and to rest, and then to keep their Sabbath, Dec. 10. Monday (Dec. 11 of their reckoning, 21 of ours) they 'sounded the harbor and found it fit for shipping,' says Bradford; 'and marched into the land and found divers cornfields and little running brooks, a place (as they supposed) fit for situation; at least it was the best they could find, and the season and their present necessity made them glad to accept of it. So they returned to their ship again with this news to the rest of their people, which did much comfort their hearts.' In their absence Gov. Bradford's wife had been drowned Dec. 7, one of four deaths while the ship lay at Cape Cod. 'On the 15th of Dec.' (our 25th), as Bradford relates, 'they weighed anchor to go to the place they had discovered, and came within two leagues of it, but were fain to bear up again; but the 16th day [our 26th] the wind came fair, and they arrived safe in this harbor. And afterwards took better view of the place, and resolved where to pitch their dwelling; and the 25th day began to erect the first house for common use to receive them and their goods.' They built with logs, with clay mortar in the chinks between them, and with roofs over which a cover of thatch was put. To make the common house, about 20 ft. square, 'some should make mortar, and some gather thatch,' says the record, 'so that in four days half of it was thatched.' Dec. 28, 'so many as could went to work on the hill, where we purposed to build our platform for our ordnance'—a combination of meeting-house and fort, with a place of assembly under a flat roof on which the artillery were mounted, guns 3 to 4 inches bore, with some smaller ones. Between the hill and the harbor they laid out ground for 19 families, into which all were distributed. The record says: 'We thought this proportion was large enough at the first, for houses and gardens to impale them round, considering the weakness of our people, many of them growing ill with colds; for our former discoveries in frost and storms, and the wading at Cape Cod [their only way to reach shore], had brought much weakness amongst us, which increased so every day more and more, and after was the cause of many of their deaths.' A letter of later date, 1621, Dec. 11, says of the building plans carried out: 'We have built seven dwelling-houses and four for the use of the plantation, and have made preparation for divers others.' The same letter shows that they used oiled paper for their windows. Jan. 9 they began to build houses on either side of 'Leyden' street, as the name came to be. Jan. 14 the common house, which was used as a general rendezvous, took fire, 'by a spark that flew into the thatch and burned it all up; but the roof stood, and was little hurt.' 'The most loss,' says the record, 'was Master Carver's and William Bradford's who then lay sick in bed, and if they had not risen with good speed had been blown up with powder. The house was as full of beds as they could lie one by another, and their muskets charged.' It was on a Sabbath morning, about 6, when the tide was down, and those on the ship, which had to lie nearly a mile and a half from the shore, could not get to land. They had planned to keep their Sabbath for the first time on shore, 'because now there was the greater number of people.' A week later, Jan. 21 (our 31), the record says, 'We kept our meeting on land.' It was six full months from their taking ship at Delft Haven. Jan. 19 they made plans 'to build a shed to put our common provisions in, of which some were already set on shore;' and the next day, Saturday, 'made up our shed for our common goods.' The Lord's Day, Jan. 21 (our 31) was the first day that saw all together on land. Monday, 22, 'we wrought on our houses, and in the afternoon carried up our hogsheads of meal to our common storehouse.' The next Monday, Jan. 29, the long boat of the ship and their own shallop 'brought our common goods on shore.' Lord's Day, Feb. 4, the worst storm of any they saw fell on them, wind and rain with great violence, badly washing the clay out of the interstices of their thatched log-cottages, and imperilling those still on the ship, which was light because all the goods had been got on shore. Friday, Feb. 9, the story says, 'our little house for our sick people was set on fire by a spark that kindled in the roof; but no great harm was done.' It is not until Mar. 21 (our 31) that the ship was no longer the home of any of the company. 'This day,' the record says, 'with much ado we got our carpenter, that had been long sick of the scurvey, to fit our shallop to fetch all from aboard.' On four days, Feb. 17, Mar. 16, 21, and 22, meetings for 'establishing military orders' were interrupted by the appearance of savages; and Feb. 21 they got three larger and two smaller guns mounted on the hill. The first of the meetings named got so far as to elect and commission Miles Standish captain of the common command, and Mar. 23 a fifth meeting finished the business, and also re-elected Carver governor.

The next record is: 'Mar. 24 dies Elizabeth the wife of Mr. Edward Winslow. N.B. This month 13 of our number die. And in three months past dies half our company; the greatest part in the depth of winter, wanting houses and other comforts, being affected with the scurvey and other diseases, which their long voyage and unaccommodate condition brought upon them; so as there die sometimes two or three a day. Of a hundred persons scarce fifty remain; the living scarce able to bury the dead; the well not sufficient to tend the sick, their being, in their time of greatest distress, but six or seven sound persons, who spared no pains, night nor day, but with abundance of toil and hazard of their own health, fetched them wood, made them fires, dressed them meat, made their bed, washed their loathesome clothes, clothed and unclothed them. Two of these seven were Mr. William Brewster, their reverend Elder, and Miles Standish, their Captain and military commander, unto whom myself and many others were much beholden in our low and sick condition. And what I have said of these I may say of many others who died in this general visitation, and others yet living, that whilst they had health, yea, or any strength continuing, they were not wanting to any that had need of them.' The exact record of deaths was: 6 in Dec., of which 4 at Cape Cod; 8 in Jan.; 17 in Feb. (4 on the 21st); 13 in Mar.; and before a ship came from England (1621, Nov.) 6 more had died, making 50 deaths, and leaving 50 survivors (not counting births) to enter on the second year of the colony's struggle for existence. Of the 41 men who signed the compact only 20 were left at the end of March, including

Gov. Carver, whose death followed very soon; and of these 20, the wives of four, Bradford, Standish, Allerton, and Winslow, had died, besides 19 women, children, and servants, whose names are not given; and Mrs. Carver's death followed her husband's. The *Mayflower* sailed back Apr. 5, and arrived in England May 6, but none thought of return, and 'the spring advancing it pleases God the mortality begins to cease, and the sick and lame recover; which puts new life into the people, though they had borne their sad affliction with as much patience as any could do.' The 'answerable courage' to make sure of a founding, even though, as they had said beforehand, 'they should be but even as stepping stones unto others for the performing of so great a work,' in 'some of those vast and unpeopled countries of America,' was shown by their burial, in that winter of deadly plague, of the 40 who fell in three months, not on the future burial hill, but on the lower brow close to the rock of landing, smoothing down the surface over the graves to conceal from the spying savages the fact that the colony was wasting away. The burials probably at night, the coffinless dead borne forth on the rude bier of the wilderness, illustrate the pathetic heroism of such holding by seven men of the gate of a continent, as they gave warrant for a word sent from England, 1623, Apr.: 'Let it not be grievous unto you that you have been instruments to break the ice for others who come after you; the honor shall be yours to the world's end.'

Famine was in the first years not the least of their difficulties. In 1622 they were six months on half allowance, and then in June their stores were gone and the people famishing. They could not, for lack of nets, take the bass plentiful in the outer harbor, nor, for lack of deep-water tackle, the cod in the bay. Game and ground nuts were not in season. They had no meat, bread, or vegetables. Even when Winslow went on a coast trip to gather a little food, it gave but 4 oz. a day of bread. Worse famine still befell in 1623 about planting time; and the only relief was the uncertain fishing. Yet with a meagre wooden platter of boiled clams Elder Brewster failed not to give thanks that they 'were allowed to suck of the abundance of the seas and of the treasures hid in the sand.' No troubles ever overcame their cheerful courage. They numbered, after four years, only about 180 persons and 32 families, but their conquest of a good foundation for all generations to come was secure, and in four years more, Endicott's company at Salem, 1628, Sep., and Higginson's, 1629, May, followed by the great band under John Winthrop, began the coming, direct from England, of the more than 20,000 people, in 300 ships, which within less than a quarter of a century from the Pilgrim landing, made New England, except in the Old Colony, and in the Rhode Island of Roger Williams (a Rigid Separatist, rigorous in independence, but lacking the broad Pilgrim liberality), a land of the church-and-party Puritans.

The ardor of Robinson and his remaining people at Leyden to follow Brewster's company to their refuge in the wilderness, was not dampened by any report of troubles; but church-Puritan stockholders in London gave way to spleen against the liberal independency, the non-ecclesiastical basis, of the Leyden people, and as much as possible kept them from a chance to go. In the weary waiting Robinson died, 1625, Mar. 1, and three years later, to overcome finally the trouble, after two detachments had come, 1621, Nov., and 1623, Aug., without the pastor or the main church body, a scheme was formed at Plymouth, by which 8 of the chief there bought out the London stockholders, paying £200 a year for 9 years, from 1628, and assuming £600 of colony debts. The communism thus far existing in the colony had been forced on them from London, and was as soon as possible done away.

The Pilgrim church at Plymouth had a varied experience of pastors not to their mind, but generously entertained, without question of differences. Brewster, who survived about 23 years, was their true minister, though not ordained ecclesiastically; and their custom of meeting was for brethren, of whom many were able and instructed, to take part after the sermon in speaking, on the principle known to them and urged by Robinson, as 'the liberty of prophesying.' Their formal order never stood before the world as it would have done if Robinson had lived with them as long as Brewster did; but the fine and lofty spirit which was peculiar to them, their genius for broad humanity, their rule of liberal independency, have come at last to wide prevalence in the English America which they planted.

See CONGREGATIONALISM: CROMWELL, OLIVER: PURITANS.

PILI, n. plu. *pī'lī* [L. *pĭlus*, hair]: in *bot.*, fine slender hair-like bodies covering some plants. Pilifer, a. *pĭl'-ĭ-fer*, or Piliferous, a. *pĭl-ĭf'ėr-ŭs* [L. *fero*, I bear]: in *bot.*, covered with hair. Pil'iform, a. *-fawrm* [L. *forma*, shape]: resembling hairs.

PILIDIUM, n. *pī-lĭd'ĭ-ŭm* [Gr. *pilĕŏs*, a cap; *eidos*, resemblance]: an orbicular lichen-shield; the larval form of *Nemer'tĭda*.

PILL, v. *pĭl* [from Pill 3]: in *slang*, to black-ball a candidate at a club; to reject by an adverse vote. Pill'ing, imp. Pilled, pp. *pĭld*.

PILL, v. *pĭl* [W. *pilio*, to peel or skin; *pîl*, peel, rind: Dan. *pille;* Norw. *pila*, to pick: F. *piller;* L. *pilārè*, to make bare or bald]: in *OE.*, to take off the rind or outer covering; to peel; to strip; to rob; to extort; to plunder. *Note.*—The original sense of *pill* and *pillage* was that of pilling or peeling, and then to rob or plunder: see Pillage.

PILL, n. *pĭl* [F. *pilule*, a pill—from L. *pĭlŭla*, a little ball—from *pĭla*, a ball]: medicinal substance formed into the shape and size of a pea, to be swallowed whole: anything nauseous: V. to form into pills; to dose with pills. Pill'ing, imp. Pilled, pp. *pĭld*. Pill-mass, the stiff paste or medicated compound out of which pills are formed. Pilule, n. *pĭl'ūl*, a small or diminutive pill.—*Pills* are the most generally convenient and popular of all forms of medicine. They are formed from masses of consistence sufficient to preserve the globular shape, yet not so hard as to be of difficult solution in the stomach and intestines. This form is especially suitable for (1) all remedies which operate in small doses, e.g., metallic salts; (2) those designed to act slowly and gradually, e.g., some alteratives; (3)-those too readily soluble when exhibited in other forms; (4) substances whose operation it is desirable to retard until they have reached the lower intestines, as in some remedies, for habitual costiveness; (5) substances whose specific gravity is too inconsiderable to allow their suspension in aqueous vehicles; and (6) fetid substances: while it is unsuitable for (1) medicines which require to be given in large doses; (2) deliquescent salts; (3) fluid or semi-fluid substances, e.g., oils, balsams, etc., which require a very large proportion of some dry powder to render them sufficiently tenacious to form into a mass; (4) substances so insoluble, that when exhibited in solid form they pass through the intestinal canal unaltered, e.g., extract of logwood. Many substances, e.g., vegetable extracts, may be formed into pills at once without any addition; but most substances require the addition of a material termed an excipient, for converting it into a pill-mass. The excipients in most common use are bread-crumbs, hard soap, extract of licorice, mucilage, syrup, treacle, honey, castor-oil, and conserve of roses. For the property of preserving pills for a long time in a properly soft state, the most valuable excipient is the conserve of red roses; perhaps next to it treacle is the most valuable excipient, as it does not undergo any change by time, but maintains a proper consistence, and preserves the properties of vegetable powders unimpaired for years. It is common to place pills in some fine powder, to prevent them from adhering to each other, and to conceal their taste. For this purpose, licorice powder, wheat flour, starch, and magnesia are generally used, also lycopodium. Pills retain their moisture and activity far longer in little bottles than in the ordinary pasteboard boxes. If the weight of a pill much exceeds five grains, it is too bulky to swallow conveniently if it consist of vegetable matter. Patients who express their inability to take this form of medicine, can soon overcome the difficulty if they practice with a small globular mass toward which they feel no repugnance, as a pellet of bread or a currant—placing it on the back of the tongue, and gulping it down with water.

PILLAGE, n. *pĭl lāj* [F. *pillage*, pillage—from *piller*, to rob: Sp. *pillar*, to plunder: It. *pigliare*, to seize: Dan. *pille* to pick (see Pill 2)]: plunder; spoil; that which is taken in war; the act of plundering: V. to strip of money or goods by violence; to plunder. Pil'laging, imp. Pil'laged, pp. *-lājd.* Pil'lager, n. *-lā jėr*, one who pillages.—Syn. of 'pillage, n.': plunder; rapine; booty; spoil; prey.

PILLAR, n. *pĭl'lėr* [F. *pilier;* Sp. and Port. *pilar*, a pillar—from mid. L. *pilārĕ*, a pillar—from L. *pīla*, a pillar]: a column of any shape to support (see below): anything that sustains or upholds; a foundation; a support; in *personal sense*, a supporter. Pil'lared, a. *-lėrd*, having the form of a pillar, or supported by pillars. Pil'larists (see Pillar Saints). Pillars of Her'cules, *-kū-lēz*, the opposite rocks at the entrance of the Mediterranean Sea (see Hercules, Pillars of).

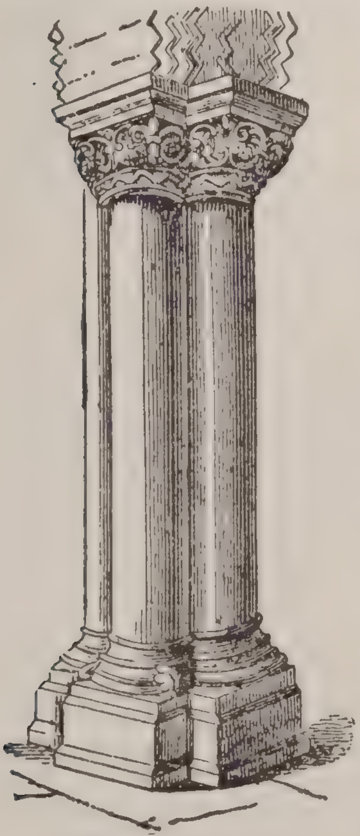


Fig. 1.—Norman Clustered Pillar.

PIL'LAR: detached support like a column; but its section may be of any shape, whereas the column is always round. Pillars have been used in all styles of architecture, and their forms and ornaments are usually among the most characteristic features of the style. The Greek and Roman pillars (or columns) are the distinguishing elements in the various orders. In Gothic architecture, also, the pillars are of different forms at the various epochs of that style. First, in the Norman period, are plain massive pillars, square, circular, and octagonal, frequently ornamented with zigzag ornaments, spiral bands, etc., on the surface (fig. 1). As vaulting was developed, the system of breaking the plain surface, and giving to each portion of the vaulting a separate little column or shaft to support it, was introduced. This was done either by attaching shafts to the circular pillars, or by cutting nooks in the pillar and setting little shafts in them: *a*, *b*, fig. 2.—In the Early Pointed Style a plain circular or octagonal pillar, with a number of small shafts attached around it, is a favorite arrangement: *c*, *d*, fig. 2.—In this style, the attached shafts are very frequently banded to the main pillar at different heights, and they are sometimes made of finer material. such as Purbec marble.—In the Decorated Style the pillar is of lozenge form, and not so much ornamented with detached shafts as with moldings; plain, circular, or octagonal pillars, however, are used in this. as in all the styles. The moldings and shafts are usually filleted; and some of the moldings run up into the arch without any cap.—In Perpendicular the same idea is carried further; the moldings become thinner, and are more frequently run up into the arch without caps. See FLAMBOYANT.

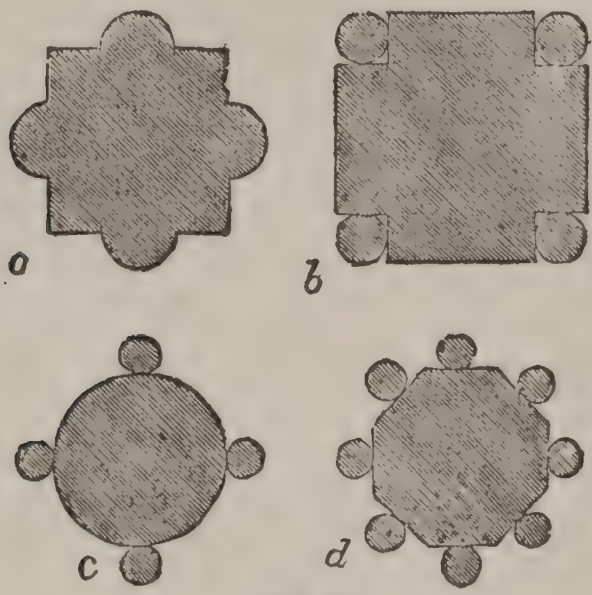


Fig. 2.

PILLAR SAINTS; called also 'STY'LITES' [Gr.—from *stylos*, a column] 'Pillarists,' 'Holy Birds,' 'Air Martyrs,' and several similar names: remarkable class of anchoretical Ascetics (see ASCETICISM), chiefly of Syria, who, with a view to separating themselves more completely from earth and fellow-men, took up their abode on the tops of pillars, on which they remained without ever descending to earth, and exposed to all the variations of a Syrian climate. The earliest of them, and the most celebrated, Simeon (called also Simon) the Stylite, had been a monk, and had lived, in the beginning of the 5th c., in extreme seclusion in his monastry for nine years, without ever moving from his narrow cell. Increasing in enthusiasm, he withdrew to a place about 40 m. from Antioch, where he built a pillar, on the top of which, only a yard in diameter, he took up his position. From this pillar he removed to several others in succession, each higher than its predecessor, till at last he attained to 40 cubits, or about 60 ft. in height. In this mode of life he spent 37 years, his neck loaded with an iron chain, and his lips engaged in constant prayers, during the recitation of which he bent his body so that his forehead touched his feet. His powers of fasting were no less marvellous; he is said to have frequently limited himself to a single meal in the week, and during the 40 days of Lent to have abstained entirely from food. The fame of his sanctity brought crowds of pilgrims from the most distant countries, even Britain itself, to see him; and the admiration of his austerities is said to have converted many pagans and Saracens to the church. In trial of his virtue, through the test of humility, some neighboring monks reproaching him with vanity, and the love of novelty in this extraordinary mode of life, ordered him to come down from his pillar. Simeon prepared without hesitation to comply, and the compliance was accepted as evidence of his perfect humility and holiness of purpose. It is said that in consequence of an ulcer which was formed on one of his legs, he was obliged for the last year of his life to remain on his pillar upon one foot. In this position he died in 460, aged 72 years. A disciple of Simeon, named Daniel, succeeded to his reputation for sanctity; and to his mode of life, which he maintained 33 years, in the still more trying climate of the shores of the Bosporus, about 4 m. from Constantinople. The marvels of Daniel's career are still more startling. He was sometimes almost blown by the storms of Thrace from the top of his pillar. At times for days together he was covered with snow and ice. How he sustained life, what nourishment he took, was a mystery even to his disciples. The emperor at length insisted on a covering being placed over the top of the pillar, and Daniel survived till the year 494. In Syria there were many pillar saints as late as to the 12th c.; but in the west, Daniel is almost a solitary example. A monk named Wulfailich, near Trier, attempted the pillar-life in the 6th c., but the neighboring bishops compelled him to desist, and destroyed his pillar.

PILLAU, *pĭl'low:* fortified town in E. Prussia, at the entrance of the Frische Haff to the Baltic Sea. It has a good harbor, and is the port of Königsberg (q.v.) 25 m. distant, with which it has railroad connection, and a large river commerce in summer. It is the port also of Elbing and Braunsberg. Pop. about 3,200.

PILLAW, or PILLAU, n. *pĭl-law'* [Turk. *pilaw*]: a Turkish dish, consisting of rice cooked with fat, butter, or meat.

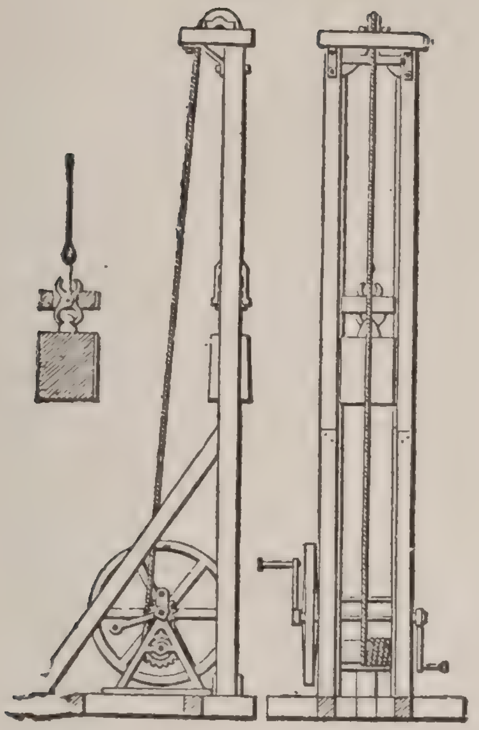
PILLIBHIT, *pĭl-lē-bēt'*, or PHILLIBIT, *phĭl-lē-bēt':* town of India, in the N. W. Provinces; 28 m. n.e. by e. from Bareilly. It has considerable trade. Pop. 29,721.

PILLION, n. *pĭl'yŭn* [Gael. *pillean*, *pillin*, a saddle-cloth—from *peall*, a skin: Sp. *pillon*, a skin: comp. W. *pilyn*, a clout, L. *pellis*, a skin]: a cushion for a woman to ride on behind a horseman; a soft low saddle; the pad or cloth below a saddle next the horse's back.

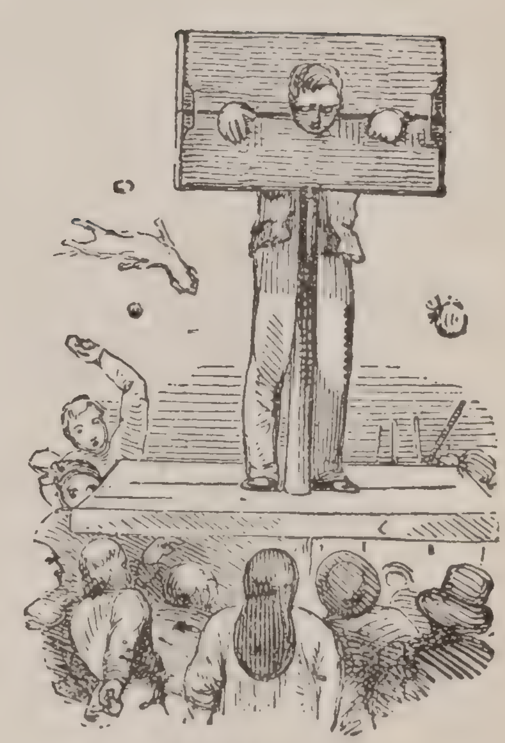
PILLNITZ, *pĭl′nĭts:* palace and ordinary summer residence of the royal family of Saxony, in a beautiful situation seven m. s.e. of Dresden. The grounds are finely diversified, and the walks ascend to the summits of hills, of which one is nearly 1,000 ft. high. P. acquired historic interest from the meeting of princes in the castle 1791, Aug., when the Declaration of P. was framed, according to which Austria and Prussia agreed to declare the condition of the king of France (then a prisoner in the Tuileries, after his ineffective flight to Varennes) a matter of common interest to the sovereigns of Europe, and to express the hope that common cause would be made for his restoration. The emperor and the king of Prussia were resolved to use force to effect this result; but any immediate interference on their part was rendered unnecessary by Louis's acceptance of the constitution as modified by the national assembly, after which he was again placed on the throne.

PILLORY, n. *pĭl′-lŏr-ĭ* [F. *pilori,* the pillory, a name formerly given in France to a ruff or collar worn by women around the neck, like the board of the pillory; prov. F. *espitlori,* the pillory: Sp. *espitllera,* a loop-hole, a little window: mid. L. *pillor′icum, spiliorium:* according to Wedgwood, various derivations have been suggested, of which most plausible is Fr. *pilier,* from the pillar or post at which the criminal is compelled to stand]: scaffold, on which was erected a post or pillar surmounted by a flat board pierced with holes for the head and hands of the offender, who stood in an upright position, with his hands and head jutting out on one side of the flat board: V. to punish with the pillory. PILLORYING, imp. *pĭl′ŏr ĭ-ĭng:* N. placing in the pillory; punishing by the pillory. PIL′LORIED pp. *-ĭd:* ADJ. put in a pillory.—The *Pillory* was an engine for the public punishment of criminals, disused in Britain since 1837; but previous to that time commonly employed, as it also was in France and Germany. It consisted of a stout plank fixed like a sign-board on top of a pole, the pole itself being supported on a wooden platform elevated from the ground. Above, and parallel to this plank, another of similar dimensions was placed in a similar position with respect to the pole, and fixed to the former by a hinge at one end, being thus capable of being moved upward from it, or closed upon it, when necessary. A large circular hole is cut, with its centre in the line of junction of the two planks, and two corresponding holes of smaller size are formed. one on each side of it; the large hole is for receiving the neck, the two smaller for the wrists. When a criminal is to be placed in the P., he is made to mount and stand upon the platform; the upper of the two hinged planks is raised to allow the culprit's neck and wrists to be inserted in their proper grooves, and then brought down into its place, and fastened by a padlock, or in some other way. (See OATES, TITUS.) The P. seems to have been used in England before the Conquest, in the form of the stretch-neck (an instrument by which the neck only was confined), and was originally intended, according to the

PLATE 8.



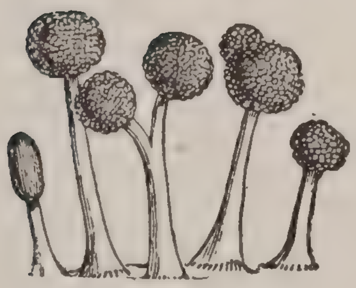
Pile-driver.



Pillory.

Riding on a **Pillion.**

Pileus.



Pilidia of Lichen.

Pillory.

'Statute of the Pillory' (51 Hen. III. c. 6), for 'forestallers, users of deceitful-weights, perjury, forgery, etc.,' and all such dishonorable offenses. Its use was exclusively confined to this class of offenders till 1637, when restrictions were put on the press, and all who printed books without a license were put in the P. From this time it became the favorite mode of punishing libellers (or those who were considered such by the government), authors and publishers of seditious pamphlets, or of strictures on the government; and many eminent men were accordingly from this time put 'in and on the pillory,' e.g., Leighton, Lilburn and Warton, the printers, Prynne, Dr. Bastwick, Daniel Defoe, etc. The insufficiency of the P. as a means of inflicting a definite amount of punishment became apparent; for to those who were popular favorites it was no punishment at all, while those who were objects of popular dislike were ill-used to such an extent as occasionally to cause death. The sufferers above mentioned being popular favorites, or having at least numerous supporters, were shaded from the sun, fed, and otherwise carefully attended to; while the encouragement, applause, and sympathy of the crowd around converted the intended punishment into a triumph; but such men as Titus, Oates, and the class of offenders including perjurers, swindlers, polygamists, etc., who were objects of popular hatred and disgust, were pelted with rotten eggs (the favorite missile), garbage, mud, sometimes even with more dangerous missiles. In 1814 the celebrated naval hero Lord Cochrane (see DUNDONALD, EARL OF) was sentenced to the P.; but the government of the day was not prepared to brave the consequences of such an act, and the sentence was not carried into effect. In France the P. was called anciently *pilori*, and in recent times *carcan*, from the iron collar by which the criminal's neck was attached to the post: punishment by this mode was abolished in that country 1832.

PILLOW, n. *pĭl′lō* [AS. *pyle:* Dut. *peluwe* or *puluwe*, a pillow—from L. *pulvīnus*, a cushion: L. *pluma;* W. *plu*, feathers]: a cushion or bag for the head to rest on in bed, usually filled with feathers; something that bears or supports: ADJ. applied to a kind of lace, because made on a pillow or cushion: V. to rest or lay on for support. PIL′LOWING, imp. PIL′LOWED, pp. *-lōd:* ADJ. supported by a pillow. PIL′LOWY, a. *-lō-ĭ*, resembling a pillow; soft. PILLOW-BLOCK, in *mech.*, a block or standard hollowed for supporting the end of a shaft. PILLOW-CASE, or PILLOW-SLIP, the covering for a pillow.

PILLOW, *pĭl′lō*, GIDEON JOHNSON: soldier: 1806, June 8—1878, Oct. 6; b. Tenn. He graduated from the Univ. at Nashville 1827, became a lawyer and practiced at Columbia, Tenn.; was influential in securing the nomination of James K. Polk for the presidency 1844; served with great distinction in the Mexican war, and was promoted maj.gen. 1847. He had a disagreement with Gen. Scott, who charged him with insubordination; but he was acquitted by a military court of inquiry called at his own request. He represented the conservative element at the

Nashville Southern convention 1850, and was a prominent candidate for nomination as vice-pres. at the democratic national convention 1852. He engaged heartily in the Confederate service 1861, raised and organized troops, was appointed maj.gen., declined the chief command at Fort Donelson, and fled thence to avoid surrender. Later he served under Gen. Beauregard. He died in Arkansas.

PILLSBURY, *pĭlz′bėr-ĭ*, Amos: 1805–1873, July 14; b. N. H. For many years he was warden of the Conn. state prison, was in charge of prisons in other states, and for a while was supt. of the New York police force. The form and arrangement of the penitentiary at Albany were largely according to his plans, and he was in charge of the institution for many years. He was a prominent member of the London prison congress 1872, was a strict disciplinarian, and was remarkably successful in prison management. He died at Albany.

PILLS′BURY, John S.: born Sutton, N. H., 1827, July. After serving a clerkship in a store, he engaged in business, removed to the West 1854, was in the hardware business at St. Anthony's Falls, Minn., and afterward became a flour manufacturer in Minneapolis. This business in his hands grew to immense proportions. He was several times a member of the state senate, was gov. of Minn. 1875-77, and for many years was a member of the board of regents of the Minnesota State Univ., of which institution he was a liberal benefactor. D. 1901, Oct.

PILLS′BURY, Parker: reformer: 1809, Sep. 22; born Hamilton, Mass. After working on a farm for some years, he studied theology, and for a short time preached in New London, N. H. From 1840 till slavery was abolished he was employed by anti-slavery societies as an abolitionist lecturer, and for a portion of the time as editor. He afterward was connected with the woman-suffrage movement, and 1869-70 edited the *Revolution*. He afterward preached for various free religious associations. His publications include the *Acts of the Anti-Slavery Apostles* (1883) and numerous pamphlets. D. 1898, July.

PILOSE, a. *pī′lōs*, or Pilous, a. *pī′lŭs* [L. *pilōsus*, hairy, shaggy—from *pĭlus*, hair]: in *bot.*, covered with long distinct hairs; abounding in hairs. Pilosity, n. *pī-lŏs′ĭ-tĭ*, the state of being covered with hairs.

PILOT, n. *pī′lŏt* [It. *pilota;* F. *pilote*, a pilot: Dut. *pijlloot*, a pilot—from *peilen*, to sound the depths; *loot*, to lead, direct: comp. Gael. *peilloth*, a plummet]: *literally*, one who conducts a vessel by the sounding-line: one whose occupation is to steer ships into and out of a harbor or along a dangerous coast (see below): a guide: V. to steer; to guide or direct, as a pilot; to guide through dangers and difficulties. Pi′loting, imp.: N. the act of steering a ship; a directing; direction. Pi′loted, pp. Pi′lotage, n. *-āj*, the fee or wages paid to a pilot; the act of piloting. Pilot-fish (see below). Pilot-boat, a boat used by pilots for reaching ships, generally those coming from foreign parts. Pilot-cloth, a stout, blue, woolen cloth, used for greatcoats and for the clothing of seafaring people, and others. **Pilot-engine**, on a *railway*, an engine sent before to clear the line, as before an advancing train, or as an attendant on a train containing great personages. **Pilot-jack**, a union or other flag hoisted by a vessel for a pilot. **Pilot-jacket**, a pea-jacket, which see.

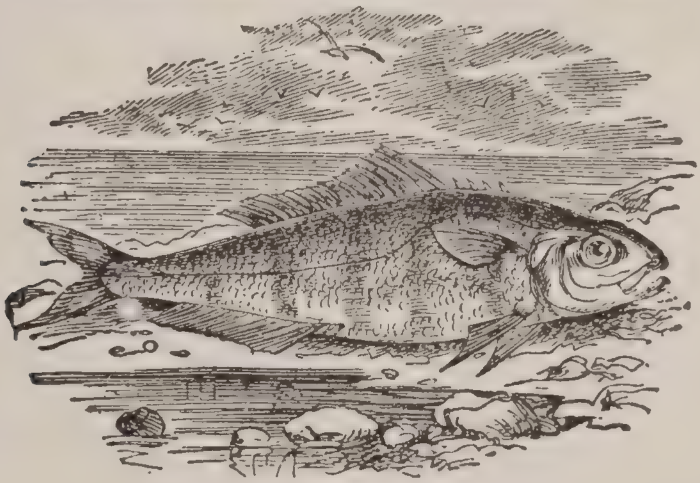
PI′LOT: person specially deputed to take charge of a ship while passing through a particular sea, reach, or dangerous or intricate channel. The intricacy of almost all coast navigation renders it impossible that any navigator, however skilful, can be master of all the waters into which he may have to sail his ship; and the risk of disaster, through ignorance of local dangers, is therefore avoided by transferring the direction of the ship's course to some one perfectly acquainted with the spot. The man to whom so much is intrusted must be a responsible person, and therefore in all countries qualified sailors are officially licensed to act as pilots in their districts, and they are granted the monopoly. The laws of Wisby, promulgated at least as early as the 14th c., subsequently incorporated in nearly every maritime code, render it compulsory on the master of a ship to employ a P. when sailing near a coast.

In the United States, the regulation of P. service is left by congress to the several states, whose governments, through P. commissioners or similar officers, fix the conditions on which license shall be granted to pilots, and the offenses or derelictions that will work its cancellation or suspension, the states determine also the charges which pilots may lawfully make for their services. A ship-master is usually required to accept the services of the first pilot boarding him; reciprocally, the P. is generally required to obey the call of the ship-master. Having taken the helm, the ship is navigated under the orders of the P. which, however, are, constructively, the master's orders, for the master does not relinquish his place: in the eyes of the law, as interpreted by U. S. courts, the owners of a vessel that meets with disaster while under the orders of a P. are responsible to shippers for any loss incurred by them. The license of the P. may be revoked for misconduct or inefficiency, and his fee (pilotage) forfeited; it is an open question whether he can be held liable for the damages resulting from his acts or his negligence.

By British law, the command of the vessel, except in matters of discipline, is vested entirely in the P., who can use his discretion as to the sails, steering, etc., of the ship until the limit of the pilot's district is passed, except that the captain resumes his powers when the question of taking a place in a harbor is concerned. The general rule as to the responsibility of the owners of the ship is, that no owner or master of a ship is answerable to any person whatever for any loss or damage occasioned by the fault or incapacity of any qualified pilot acting in charge of such ship within any district where the employment of the pilot is compulsory.

In the navies of some countries the pilot is a permanent officer of the ship, and has charge of her course, but his functions in that case approach nearer to those of the British navigating officer. Large French vessels have often several sailing pilots called *pilotes hauturiers*, and a *pilote côtier* or *lamaneur*. The ancient laws of France contained provisions for education and regulation of both these classes.

PILOT-FISH (*Naucrates ductor*): fish of the family *Scomberidæ*, and belonging to a section of that family in which the first dorsal fin is represented by mere spines, and there are no finlets behind the second dorsal and the anal fins as in the mackerel, etc. The shape of the P. is very similar to that of the mackerel. It is usually about 12 inches long; general color silvery grayish-blue, five dark-blue transverse bands passing round the whole body. Its flesh is very delicate, and resembles mackerel in flavor. It is common in the Mediterranean, and appears widely-diffused through warmer parts of the ocean, often following ships for a long time and very far, in which way it has been known to come from Alexandria in Egypt, to Plymouth, England. It is rare even on the s. coasts of Britain. It has been observed many times in the harbors of the United States. It is supposed to be the *Pompilius* of the ancients, which was believed to point out their desired course to sailors. It is often seen in the company of a shark, and is therefore commonly supposed to direct the shark to its prey. Concerning this many wonderful stories are found in the writings both of voyagers and of naturalists. It has been contended, on the other hand, that the P. merely follows the ship in company with the shark for the same object that gulls follow the steamboats on our coasts—to feed on anything eatable that may fall or be thrown overboard; or that it attends the shark in order to seize small morsels of its large prey. The following statements of Dr. Bennett may be received with confidence: 'I have observed that if several sharks swim together, the pilot-fishes are generally absent; whereas, on a solitary shark being seen, it is equally rare to find it unaccompanied by one or more of these reputed guides. . . . The only method by which I could procure this fish was, that when capturing a shark I was aware these faithful little fishes would not forsake him until he was taken on board; there



Pilot-fish (*Naucrates ductor*).

fore by keeping the shark, when hooked, in the water until he was exhausted, or, as the sailors term it, "drowned," the pilot-fish kept close to the surface of the water over the shark, and by the aid of a dipping-net fixed to the end of a long stick I was enabled to secure it with great facility' (*Gatherings of a Naturalist*).—A much larger species of *Naucrates* is found on the coasts of S. America.

PILOT KNOB, *pī'lot nŏb:* conical hill in Iron co., Mo., about 6 m. below Iron Mountain. It is 3 m. in circumference at its base, and rises 600 ft. The surface is a porphyry conglomerate interspersed with layers of ore, but the mass of the hill is an ore containing 53 to 60 per cent. of an excellent grade of metallic iron. The grain is very fine, the color a light gray, and the ore is very brittle. A small village, of the same name, inhabited principally by the iron-workers, has grown up in the vicinity.

PILOT MOUNTAIN: see ARARAT.

PILOTY, *pē'lo-tē*, KARL THEODOR VON: Bavarian historical painter: b. Munich, 1826, Oct. He studied at a number of the great art-centres in Europe; and made his first reputation 1852, by his picture of the *Establishment of the Catholic League.* This was followed by productions illustrating German and Roman history, of which his *Triumphal March of Germanicus* is a good example; also his *Death of Cæsar.* Another work is *Henry VIII. sentencing Anne Boleyn to Death.* At the death of Kaulbach, he was elected pres. of the Munich Acad. The frescoes of the Bavarian national museum were painted by his brother Ferdinand. He died 1886, July 21.

PILOUS: see PILOSE.

PIL'PAI: see BIDPAI.

PILSEN, *pĭl'sĕn:* town of Bohemia, in a fertile and beautiful valley at the confluence of the Mies and the Beraun, 52 m. w.s.w. of Prague. The Church of St. Bartholomew (built 1292), the town-hall, and the house of the Teutonic Knights are interesting Gothic edifices. The town contains a gymnasium and other educational institutions, an arsenal, theatre, and a number of churches and convents. P. has leather and cloth-factories, a great alum-work, iron and coal mines, and an important brewery. Pop. (1880) 38,883; (1890) 50,221; (1900) 68,079.

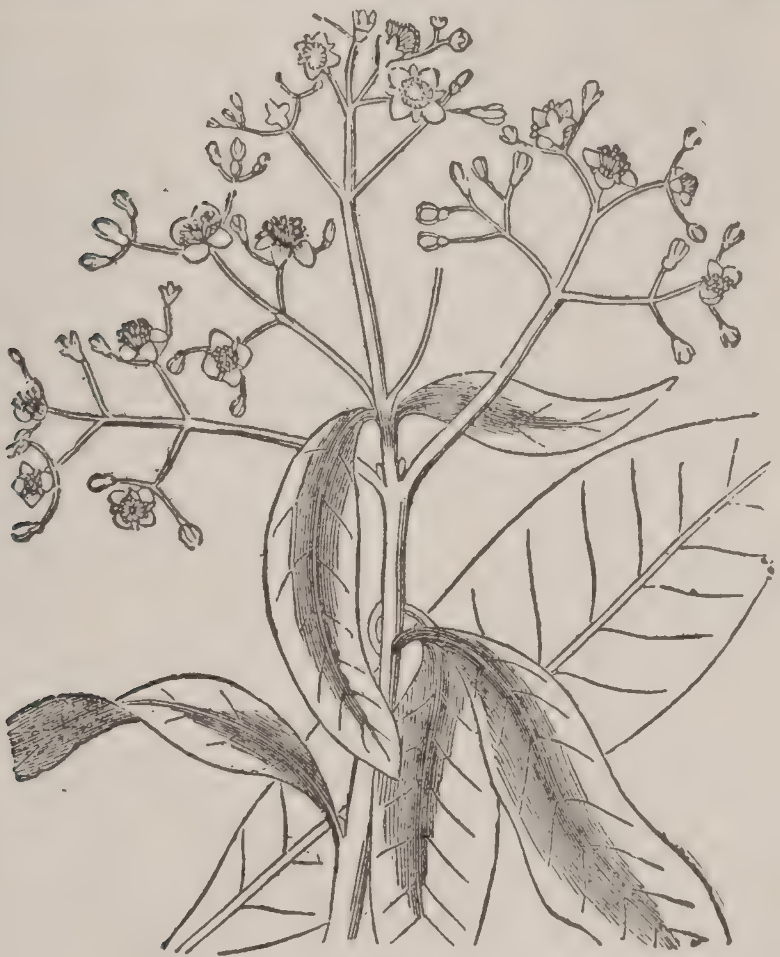
PILULE: see under PILL 1.

PIMAS, *pē'maz*, or NÉVOMES: non-nomadic family of N. Amer. Indians in Arizona and New Mexico, comprising the Pimas proper, the Opatas, Eudeves, and Joves, the Opatas being the most advanced tribe, readily adapting themselves to the customs of the whites and possessing mechanical ability. The P. proper call themselves Ohotama. They are more savage and superstitious than the Opatas, and addicted to vice and drunkenness. The P. in the United States are on a reservation of 64,000 acres set apart 1859, Feb. 28. In 1874 they numbered about 4,000, industrious and self-supporting. There were early Spanish missions among them, but the tribe is now assigned to the Reformed Church. 1899 there were 4,260.

PIMELIC, a. *pĭm-ĕl′ĭk* [Gr. *pimĕlē*, fat—from *piōn*, fat] applied to the products resulting from the action of nitric acid on fatty substances; an acid of the oxalic acid series.

PIMELITE, n. *pĭm′ĕ-līt* [Gr. *pimĕlē*, fat; *lithos*, a stone]: an earthy mineral of an apple or yellowish green color, with a dull lustre and greasy feel; a nickeliferous silicate.

PIMENTO, n. *pĭ-mĕn′tō*, or PIMEN′TA [Port. *pimenta;* Sp. *pimienta;* It. *pimento*—from L. *pigmentum*, coloring matter, thence the juice of plants]: allspice or Jamaica pepper, the dried berries of a W. Indian tree—the *Pimen′ta offĭcĭnālis*, ord. *Myrtācĕæ*. PIMENT, n. *pī′mĕnt* [OF.]: spiced or honeyed wine.—*Pimento* (called also Allspice, or Jamaica Pepper) is the dried fruit of a small tree (see EUGENIA) which grows to the height of 20 or 30 ft. and has oblong or oval leaves about four inches long, of deep shining green, and numerous axillary and terminal trichotomous panicles of white flowers, followed by small dark-purple berries. The P. tree is much cultivated in some W. Indian Islands. It is a very beautiful tree, with straight trunk and much branching head; and about the month of July is covered with an exuberance of flowers, which diffuse a rich aromatic odor. The leaves and bark partake of the aromatic property for which the fruit is valued. The fruit, when ripe, is filled with a sweet pulp, and the aromatic property, which so strongly characterizes it in its unripe state, has mostly disappeared. The gathering of the berries, there-



Pimento.

fore, takes place as soon as they have reached their full size, which is about that of pepper-corns. They are gathered by the hand, and dried in the sun on raised wooden floors; during which process great care is taken, by turning and winnowing, to prevent them from injury by moisture. Their color changes in drying, from green to reddish-brown. When dry they are packed in bags for the market. Some planters kiln-dry them.—The name *Allspice* was given to P. from a supposed resemblance in flavor to a mixture of cinnamon, nutmeg, and cloves. P. is much used in cookery, also in medicine as a carminative and stimulant to prevent the griping of purgatives and to disguise the taste of nauseous drugs. It depends for its properties chiefly on a volatile oil, *Oil of P.*, obtained from it by distillation with water, and which is used sometimes to relieve toothache, and for making the *Spirit of P.* (or of *Allspice*) and *P.* (or *Allspice*) *Water* of the shops.

PIMP, n. *pĭmp* [OF. *pimpée,* tricked up—from *pimper,* to make spruce]: a man who provides gratification for the lust of others: V. to pander to the lust of others. PIMP'ING, imp. PIMPED, pp. *pĭmpt.* *Note.*—Littré says that F. *pimper* is a nasalized form of *piper,* to pipe, to deceive, to cheat; in which case PIMP is a spruce fellow, a deceiver.

PIMPERNEL, n. *pĭm'pėr-nĕl* [OF. *pimpernelle;* It. and new L. *pimpinella:* F. *pimprenelle:* said to be a corruption of the Celtic Gaulish *pumpedu'la* or fire-leaf, the common *Potentilla reptans,* a plant having slender creeping runners, quinate leaves, and large yellow flowers, ord. *Rosācĕæ*]. (*Anagallis*): genus of plants of nat. ord. *Primulaceæ,* having a wheel-shaped corolla, and the capsule opening by division round the middle. The species are elegant little annual and perennial plants, natives chiefly of temperate climates. The flowers are not large, but very beautiful.—The SCARLET P. (*A. arvensis*) is common in Britain, occurring as a weed in fields and gardens; it is common also in most parts of Europe and many parts of Asia. The flowers are of fine scarlet color, with a purple circle at the eye. There is a common belief in England, mentioned by Lord Bacon, that when this plant opens its flowers in the morning a fine day may be expected; and they certainly close very readily on the approach of rain. They usually open about eight in the morning, and close about noon.—The BLUE P. (*A. cærulea*), is far less common in Britain, but very abundant in parts of Europe.—The BOG P. (*A. tenella*), frequent in bogs in England, is an exquisitely beautiful plant.—Several species are cultivated in flower-gardens.—Acrid properties prevail in this genus, and *A. arvensis* has been used medicinally in epilepsy, dropsy, and mania.—The name WATER P. is given to *Samolus Valerandi,* called also *Brookweed,* another plant of the same order, with racemes of small white flowers, growing in watery gravelly places. It is supposed to be the *Samolus* which Pliny says the Druids gathered fasting, with the left hand, and without looking at it, ascribing to it magical virtues in the cure and prevention of diseases in cattle. Its geographic distribution extends over almost all the world. The Scarlet P. is known in the United States as the Common P., naturalized from Europe. Besides the WATER P. or Brookweed, above mentioned, native to both continents, we have a variety *Americanus*, more slender, diffusely branched, with flowers smaller and more spreading; common in wet places, and flowering June—September.

PIMPINELLA, n. *pĭm'pĭn-ĕl'lă* [new L. *pimpinella*]: a genus of plants, ord. *Umbellĭf'ĕræ;* the garden-burnet.

PIMPLE, n. *pĭm'pl* [AS. *pipel*, a pimple: W. *pwmp*, a blow, a round mass: a nasalized form of L. *pap'ula*, a pimple: Gr. *pomphos*]: a small red swelling containing matter, on any part of the body. PIM'PLED, a. *-pld*, covered with or containing pimples. PIM'PLY, a. *-plĭ*, having pimples; pimpled.

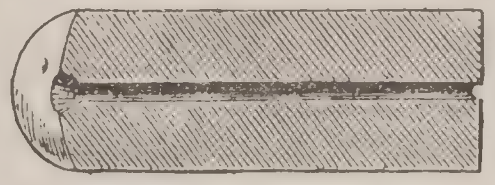
PIN, n. *pĭn* [W. *pin;* Gael. *pinne*, a pin, a pen: Dut. *pinne*, a point: L. *pinna*, a fin, a pinnacle]: short piece of wire pointed and having a head, much in domestic use for fastening articles of dress, etc. (see below): anything that holds parts together; a peg; a short shaft or bolt; the central part; a term expressive of little value, as, I don't care a pin: V. to fasten, as with a pin or pins; to make fast. PIN'NING, imp. PINNED, pp. *pĭnd.* PINNER, n. *pĭn'ėr*, one who pins. PIN'TLE, n. *-tl*, a little pin; a long iron bolt. PIN-CASE, a case for holding pins. PINCUSHION, a case stuffed with a soft material, on which pins may be stuck ready for use. PIN FEATHER, a short feather. PINHOLE, a very small hole made by a pin; a very small hole. PIN-EYED, a. a term applied by florists to those polyanthuses and auriculas which display a globular stigma at the mouth of the corolla. PIN-MAKER, one who makes pins. PIN-TAIL, a water-fowl. PIN-MONEY, money, by law in England, allowed to a wife, to be paid to her by her husband, for her private and personal expenses—formerly expended on pins only when they were very expensive, the name said to be derived from an old tax for supplying the queen with pins. Pin-money never had a legal standing in the United States; and the custom has become obsolete in England. PIN-POINT, the point of a pin; a mere trifle. SAFETY-PINS, double pins whose sharp points are protected from injuring, and are not liable to fall out. SCARF-PIN, an ornamental pin for fixing in a scarf. KNITTING-PINS, long pins of wood, bone, or metal having knobs at one end, used in knitting. WEAK ON HIS PINS, *vulgarly*, feeble in his legs or limbs. IN or TO THE PIN, the liquor tankards were marked with *pins* or pegs to indicate measures or quantities —used in reference to drinking or carousing merrily in company.

PIN, n. *pĭn:* a term applied to a petition or address by foreigners to the emperor of China, or to one of his high dignitaries.

PIN: short wire with a point and a head, used as a fastening for dress, etc. As a requisite of the toilet, etc., pins were used in Britain first in the latter part of the 15th c.; they were then made of iron wire, but in 1540 brass ones were imported from France by Catharine Howard, Queen of Henry VIII. Several inventions, however, were previously in use for holding together parts of the dress, such as buckles, brooches, laces, clasps, hooks, etc. At first pins were made by filing a point to a proper length of wire, and then twisting a piece of fine wire around the other extremity, or fixing it after twisting, in order to form a knob or head; and ultimately these operations were so skilfully conducted, that a completely round head was made of very small size, and scarcely showing the nature of its construction. Some pins are still made in this way.

Manufacture.—The old hand processes involved the following operations: 1. *Straightening and Cutting the Wire.*—It is drawn through an arrangement of upright iron rods which straighten it, after which it is cut into lengths of 30 ft., and these again to lengths of four pins. 2. *Pointing.*—This is done by two operations and different workmen, each standing at a separate grindstone; both ends are pointed. 3. *Cutting.*—The length of a single pin is cut off each end; the intermediate portions are pointed at each end, and cut in two. 4. *Twisting the Heads.*—These are made of very thin wire, which is coiled twice, by means of a lathe, around the end of a wire mandrel. 5. *Cutting the Heads.*—The head being formed on the thin wire mandrel, is cut off; as many as 12,000 heads have been made in an hour. 6. *Annealing the Heads.*—They are softened by putting several thousands into an iron ladle, and, after making them red hot, plunging them into cold water. 7. *Stamping or Shaping the Heads.*—This is pressing the heads into shape, at the same time fixing them on the pins by a small hand-press; a good worker will do as many as 12,000 to 15,000 per day. 8. *Yellowing or Cleaning the Pins.*—They are boiled for about half an hour in the dregs of sour beer, or a solution of argol or cream of tartar, and then washed in clean water. 9. *Whitening or Tinning.*—In a large copper pan is first placed a layer of about 6 lbs. of the cleaned or yellowed pins, and over these a layer of grain-tin to the amount of about 8 lbs. Several alternate layers of pins and tin are put in one vessel, and then by a pipe arranged inside the copper pan water is gently poured in, and goes through the pipe to the bottom, first rising up through the different layers so gently as not to disturb them. Fire is now applied to the bottom of the pan, and when it is nearly boiling its surface is sprinkled with ¼ lb. cream of tartar, and the whole is slowly boiled half an hour, then poured into a strainer and shaken, to separate the pins from the grain-tin and liquid; by this process a thin deposit of tin is thrown on the pins, which now are white instead of yellow; without the souring this would not take place, it being essential that they should be quite free from any oxidation or soil. 10. *Washing.*—They are thoroughly washed in pure water. 11. *Drying and Polishing.*—They are put into a large leathern bag with a quantity of bran, and violently shaken forward and backward by two men. 12. *Winnowing.*—The bran is separated by fanning. 13. *Pricking the Papers to receive the Pins.*—This is done by an ingenious machine, through which the papers are passed, and which, at regular intervals, arranged according to the size of the pins, pinches up a fold of the paper, and at the same time pricks the holes to receive the pins, and then places the pins in their places. Formerly this required a separate operation. Thus 14 persons were required to make and put up for sale a pin, and in some manufactories this is still the case; but in all the large establishments machines are now employed, with immense reduction of hand labor.

The first machine was invented 1824 by Lemuel Wellman Wright, b. in N. H.: his U. S. patent is dated 1825, Mar. 12, and is for 'making pins,' he being at the time a resident of Manchester, Eng. This did very little more than make solid heads to the pins, by a process in principle like that used for nail-making—driving a portion of the pin itself into a counter-sunk hole. The action, however, was automatic, and consisted in an arrangement by which the wire was seized in two small grooved cheeks, as in figs. 1. and 2. which represent them separated. Fig. 1 has the groove empty, but in fig. 2 is seen the wire which projects at *a*. When both cheeks are placed face to face, and the wire is held tightly in the groove with the small portion (*a*) projecting, a small ram or hammer connected with the machine strikes on *a*, and compresses it into the small cup-shaped depression *b*, and thus the head is formed, as in fig. 3. The pointing and dressing of the pins was afterward carried on as described in the processes for hand-made pins. Since Wright's invention many remarkable improvements have been effected in these machines, which have consequently become very complicated in their details, though the principles on which they act are very simple. No description would convey a satisfactory idea of these wonderful pieces of mechanism, which now, without the aid of hands, complete the pin in all respects except coloring and polishing; but a slight account of the leading features will show their mode of working. First, then, a reel of wire as



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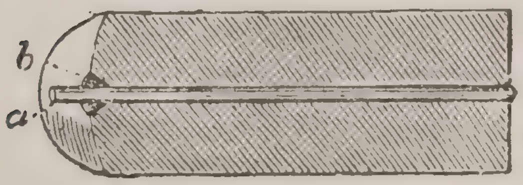

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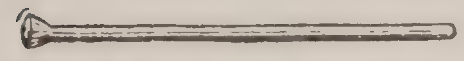

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it comes from the wire-drawer is placed in the rear of the machine, and the end of the wire is seized by a pair of nippers, which pull it over a fixed *straightening board*, and pass it on completely straightened, until it is seized by two cheeks similar to those in figs. 1 and 2, when a cutter descends and cuts it off, leaving the projecting part for the head; on the withdrawal of the cutter, the hammer flies forward, and makes the head as before described; the cheeks open, and the pins drop on to a sloping metal plate finely grooved, down which they slip with the heads upward, until the end which is to be pointed comes in contact with a cylindrical roller with a grinding surface, which soon grinds points upon them by means of two or three ingenious arrangements: the first is, that the grooved surface of the plate by which the pins descend terminates a little above the grinding roller, then a slight depression is given to the sloping plate, also to the roller, so that one end is an inch or two lower than the other; therefore, as the pin descends the groove (*a*, fig. 4), and is thus brought down the inclined plate until it is lies on the smooth part (*b*, fig. 4), where it is highest, and with its end in contact with the grinding roller (*c*) which is revolving, the pin itself is compelled by the friction of the roller to turn round, and gradually descends from the upper to the lower part of the inclined plate (*d*), and then falls off into a box placed to receive it. This is attempted to be shown in fig. 4. These operations are performed so rapidly that they can scarcely be followed by the eye, and the pins fall into the box beautifully pointed in a complete stream. They are then *yellowed*, *tinned*, and prepared for papering, which is a remarkable process. The machine by which it is done is worked by two children; one feeds the machine with pins, the other with papers. The first part of the machine is a

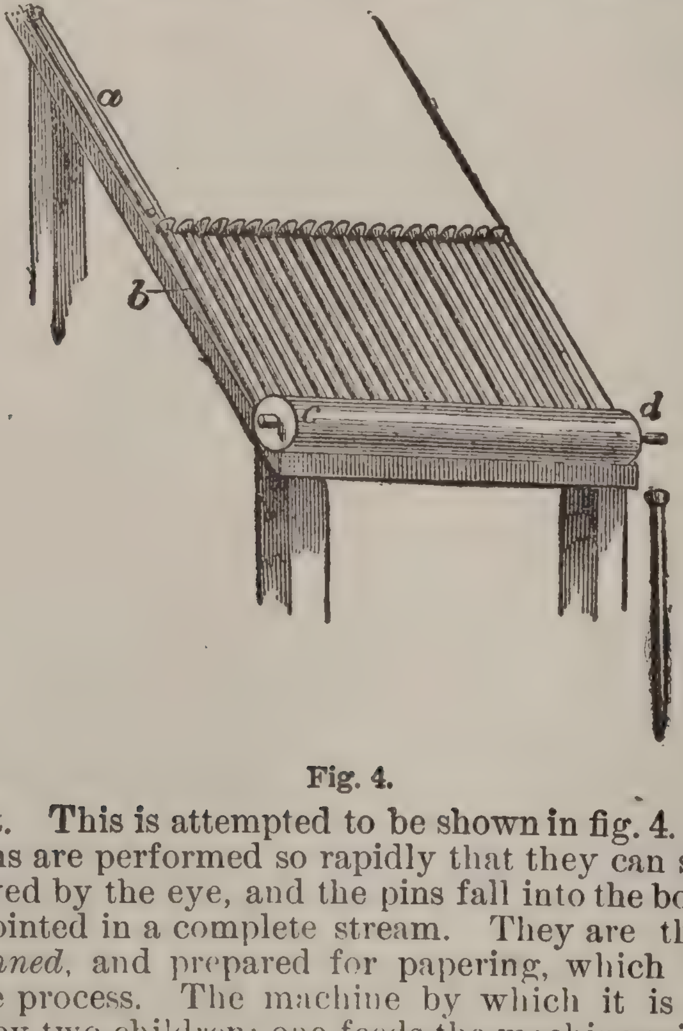


Fig. 4.

box, about 12 inches long by 6 inches broad and 4 inches deep; the bottom is of small square steel bars, sufficiently wide apart to let the shank of the pin fall through but not the head, and they are just as thick as the space between papered pins; the bottom of the box, with the row of pins hanging through it, is seen in fig. 5. The lower part of the bottom of the box at *a* is made to detach itself as soon as the row of pins is complete, and row after row at regular intervals is received and passed down a corresponding set of grooves, until they reach the paper which, as above described, is pinched into regular folds, and pierced to receive the pins which, by the nicest imaginable adjustments, come exactly to their places, and are pressed into them. Thus many thousand paper packages of pins are put up in one day by two little girls. The Amer. manufacture of pins is chiefly in Connecticut.

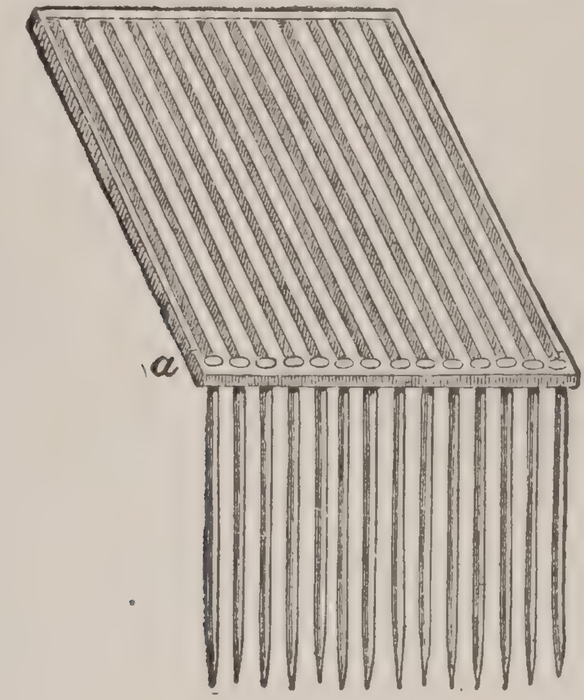


Fig. 5.

PINA CLOTH, *pī'nâ klŏth:* very beautiful fabric of the fibres of the leaves of the pineapple plant (*ananassa sativa*), and allied species. This cloth is made only in Manila, and in its manufacture resembles horse-hair cloth, because the threads both of warp and weft are each single unspun fibres—consequently only small pieces can be made; the workers have, however, a plan of joining the fibres of the coarser kinds end to end, so as to make warp threads of considerable length. Pina cloth is very strong, and the better sorts far excel the finest lawns in texture. It is employed chiefly in manufacture of ladies' pocket-handkerchiefs, which often have their costliness increased by beautiful embroidery.

PINACOTHEK, *pĭn-ăk'ō-thĕk* (Pinacotheca, *pĭn'a-kō-thē'ka*), [Gr. *pinax*, picture; *thēkē*, receptacle]: picture-gallery. The term was applied originally to a room in the left wing of the Propylæa—the grand group of structures that formed the entrance to the Acropolis of Athens, built B.C. 5th c. The room is stated to have been 34 x 26 ft., and to have contained pictures, probably on movable panels, the most of them illustrating, so far as now known, scenes in the Trojan war; also some portraits, including one of Alcibiades. At the time of the visit of Pausanias to Athens, A.D. 170, the pictures were beginning to perish. The Greeks, however, used the name P. for any gallery of pictures, public or private; and the rich Romans adopted the term for a hall in their palaces—usually at the end of the atrium, near a hall of archives—containing statues or any objects of art, as well as paintings, e.g., in the house of Pansa at Pompeii. No modern galleries bear the name except at Munich, where the Old Pinacothek was built 1826–36, adorned externally with frescos by Cornelius and 24 statues of eminent painters; it contains a collection of the old masters, chiefly early German and Flemish, with many examples of Rubens; also 300,000 engravings, 10,000 drawings, and many vases. The New Pinacothek, on a square opposite to the old, is appropriated to painters of the 19th c., and has an important collection of Rottmann's Greek landscapes. The frescos, by Kaulbach, are becoming injured by time.

PINAFORE, n. *pĭn'ă-fōr* [an abbrevation of *pinned before*]: a loose covering of cotton or linen worn in the front or around the dress of children.

PINAKENCHYMA, n. *pĭn'ăk-ĕng'kĭ-mă* [Gr. *pĭnax* or *pinăka*, a table; *eng'chuma*, an infusion]: in *bot.*, the muriform tissue of the medullary rays of woody stems, whose flattened, much shortened cells assume a tabular form.

PIN AND WEB [It. *panno nell' occhio*, cloth in the eye: the It. expression was first adopted and then translated]: an induration of the membranes of the eye not unlike a cataract.

PINANG, n. *pĭ-năng'* [Malay]: the betel-nut, *Areca catechu.*

PINASTER, n. *pī-nàs'tĕr* [L. *pinaster*, a wild pine—from *pīnus*, a pine]: the cluster-pine of s. Europe; the *Pinus pinas'ter*, ord. *Conif'ĕræ* (see Pine).

PINCERS, or Pinchers, n. plu. *pĭn'sérz* or *pĭn'sherz* [F. *pincer;* Sp. *pizcar*, to pinch: F. *pince*, the tip or edge of the hoof, nippers: Sp. *pinchar*, to prick; *pinzas*, nippers]: an instrument consisting of two parts moving on a pin, for gripping, squeezing, or holding fast; an instrument for drawing out, as nails; the claws of certain animals, as of a beetle or crab. Pinch, n. *pĭnsh*, a sharp and painful gripe by the ends of the fingers or by pincers, etc.; the mark or pain occasioned by it; the small quantity that can be held between the thumb and forefinger; pressure; oppression; distress through want: V. to gripe or squeeze between the thumb and a finger; to squeeze or press between any two sharp edges or points so as to pain; to distress; to press hard or bear hard upon, as want; to act with a force to be felt; to spare; to be frugal. PINCH'ING, imp.: ADJ. acting as a pincer; nipping; causing pain or distress: N. the act of pinching, squeezing, or pressing. PINCHED, pp. *pĭnsht.* PINCH'ER, n. *-ėr*, one who or that which pinches. PINCH'INGLY, ad. *-ĭng-lĭ.* TO KNOW WHERE THE SHOE PINCHES, to have practical and personal experience of a thing.—SYN. of 'pinch, v.': to squeeze; nip; press; compress; gall; fret; gripe; oppress; straiten; pain; force; be frugal;—of 'pinch, n.': grip; pain; distress; oppression; difficulty; pressure.

PINCHBECK, n. *pĭnsh'bĕk* [after the inventor, Mr. Christopher *Pinchbeck*]: gold-colored variety of brass, an alloy of copper or of brass with zinc; 3 parts zinc to 16 of copper constitute this material, instead of one part zinc to two copper, as in common brass. Pinchbeck, when new, has a color resembling red gold, and at the beginning of the 19th c. it was much employed for cheap watch-cases and articles in imitation of gold. PINCHBECK, a. a term applied to goods of inferior make; 'Brummagen'; make-believe.

PINCKNEY, *pĭngk'nĭ*, CHARLES, LL.D.: statesman: 1758-1824 Oct. 29; b. Charleston, S. C.; son of a cousin of Charles Cotesworth P., his father holding high state offices. Educated for the law, he was elected to the legislature while under age. After the taking of Charleston, he was a prisoner till the close of the war. He was mem. of cong. 1785; of the convention of 1787, and author of some clauses of the U. S. constitution; gov. of S. C. 1789,91,96, 1806; U. S. senator 1798, minister to Spain 1802–3, when he obtained release of all Spanish claims to territory added to the United States by purchase from France; and member of cong. 1819–21, when he was an opponent of the Missouri Compromise. In his own state he was active in promoting such enlightened measures as abolishing the disabilities of the Jews, and establishing free schools. Among his occasional political writings were papers against the alien and sedition laws. He was an able public speaker. He d. in Charleston.—His son, HENRY LAURENS P. (1794–1863), was mem. of cong. 1833–37, and founded the *Charleston Mercury*, organ of the state-rights party.

PINCK'NEY, CHARLES COTESWORTH, LL.D.: statesman and soldier in the revolution: 1746, Feb. 25—1825, Aug. 16; b. Charleston, S. C.; son of Charles P., chief-justice of S. C. He was educated at the Westminster School, and Oxford, England; studied law in London, was in the military acad. at Caen, France; returned to Charleston 1769; became atty.gen. of the province; and was mem. of the provincial congress 1775. Appointed capt., then maj., he was engaged in defending Fort Sullivan; promoted to col., he served on the staff of Gen. Washington in the battles of Brandywine and Germantown; took part in the Florida expedition; participated in the attempt to recapture Savannah 1778, and in defending Charleston against two Brit. attacks, becoming prisoner of war for two years, from 1780, when the city surrendered. In 1782 he was promoted brig.gen. When peace was restored, he resumed the law with much success; was one of the framers of the U. S. constitution, and author of the 'no religious test' clause, and advocated gratuitous service of senators as men of property. Declining several high judicial and administrative offices, he accepted the ministry to France 1796, but was not accepted by the French directory, who threatened war, and to whose suggestion that peace might be purchased, he made the answer that became a proverb—'Millions for defense, but not a cent for tribute.' In anticipation of war, he was appointed maj.gen. by Washington. In 1800 he was federalist nominee for vice-pres., and 1804 and 08 for pres. Among his other dignities, was the first presidency of the trustees of the S. C. Coll., and the same office in the Charleston Bible Soc. He was able, brave, uncompromising, as proved on many critical occasions. He d. in Charleston.

PINCK'NEY, Thomas: statesman and revolutionary soldier: 1750, Oct. 23—1828, Nov. 2; b. Charleston, S. C.; the bro. of Charles Cotesworth P., with whom he was educated in the same institutions abroad. He practiced law in Charleston; entered the patriot army 1775; was on the staff of Gen. Lincoln and Count D'Estaing in the assault on Savannah 1778, and on that of Gen. Gates in the battle of Camden, where he was made prisoner. In 1789 he was elected gov. of S. C.; in 1792 was sent as minister to Spain, and secured the free navigation of the Mississippi river; was mem. of congress 1799–1801. As maj gen. in the war of 1812, he was in some active service in the south. After his retirement, he interested himself in promoting agriculture and other industries.

PINCKNEYA, *pĭngk'nĭ-a*, or Geor'gia Bark (*Pinckneya pubens*): beautiful shrub, with clusters of purplish spotted flowers, tubular, 1 in. long, and a lobe of the calyx developed into a large rose-colored leaf. It is found in wet places from S. C. to Fla., and belongs to the Madder family (*Rubiaceæ*), which contains plants so very dissimilar in appearance as the Bedstraws, Button-weeds. Partridge-berry, our pretty Houstonia, the Coffee and Peruvain Bark trees, to the tonic value of which last the P. has some resemblance in the properties of its bark; whence the name Georgia Bark.

PINCZOVIAN, or Pinkzovian, n. *pĭngk-zō'vĭ-an* [from *Pinczow* in Poland]: name given in the 16th c. to the leaders of the Polish Antitrinitarians, for the most part originally, only Arians; they separated from the Protestant Church at a synod 1563.

PINDAR, *pĭn'dėr* (Gr. *Pindaros*): great lyric poet of Greece: about B.C. 522—prob. B.C. 442; b. at Cynoscephalæ, a village in the territory of Thebes; of noble family. His genius for music was hereditary, and at an early age he was sent by his father, himself a flute-player, to receive instruction in the same art from Scopelinus. At this time his genius for poetry too—foreshadowed, according to later writers, by a swarm of bees miraculously resting on his lips in his sleep—began to develop; and he went to Athens to be placed under the tuition of Lasus of Hermione, founder of the Athenian school of dithyrambic poetry. Before completing his 20th year he returned to Thebes, where he continued his studies under Myrtis and Corinna, of Tanagra, two poetesses then famous in Bœotia. With both his instructresses he contested the prize for music at Thebes, but was five times defeated by Corinna. He was still young when he entered on his professional career as a poet, and his services soon were in great request on festive occasions throughout the Hellenic states. He composed choral songs for Hiero, tyrant of Syracuse; Alexander, son of Amyntas, King of Macedonia; Theron, tyrant of Agrigentum; Arcesilaus, King of Cyrene; also for many free states and private individuals. He won not only admiration for his lyrical genius, but also respect for his independent character, which, amid all the presents and rewards conferred upon him, never degenerated into that of the poet who merely performed for hire. He was the favorite especially of Alexander, King of Macedonia, and of Hiero, tyrant of Syracuse; and it is said that to the praises he lavished on the former of these monarchs, his house owed its preservation at the hands of Alexander the Great, when he reduced the rest of Thebes to ruins. His life mostly was passed abroad at the courts of kings, and at the scenes of the great public games; and at one period, about B.C. 473, he resided at Syracuse at the court of Hiero for four years. Of the immense number of his poems, consisting of hymns to the gods, pæans, dithyrambs, odes for processions (*prosodia*), maidens' songs (*partheneia*), mimic dancing songs (*hyporchemata*), convivial songs (*scolia*), dirges (*threnoi*), and encomia on princes, we possess only fragments. His *Epinikia*, or Triumphal Odes, however, have come down to us entire; and from these—divided into four books, and celebrating the victories won in the Olympian, Pythian, Nemean, and Isthmian games respectively—we must form our opinion of P. as a poet. A victory at these games conferred honor not on the winner and his family only, but also on the city to which he belonged; and for its celebration—which began with a procession to the temple, where sacrifice was offered, and ended with a convivial banquet—a poem was specially composed, and was sung by a chorus either during the procession, or, more frequently, at the banquet (*comus*). P.'s poetical style is peculiar. Full of bold conceptions and striking metaphors, his manner is so rapid and so subject to abrupt transitions, as to render him not only a difficult but also an obscure composer. Typical examples of his strength, as well as of his weakness, are in the Second Olympian and First Pythian Odes, in which the description of the Islands of the Blest in the former, and of an eruption of Mount Etna in the latter, are brilliant offsets to the shadowy mythological allusion and the undeveloped metaphor which also characterize them. His metres, in spite of the able efforts of Böckh, still remain to be satisfactorily elucidated; and all that we can here say to them is, that he makes chief use of the Dorian rhythm, and frequently of the Æolian and Lydian. He has been fortunate neither in his numerous imitators nor translators—Gray being, perhaps, most successful among the former, and West, Abraham Moore, Cary (1833), Paley (1869), and E. Myers (1875), among the latter. He has been explained in Schmidt's *Pindar's Leben und Dichtung* (1852); in Villemain's brilliant *Essais sur le Génie de Pindare* (1859); and in works by J. T. Mommsen and Mezger (1880). The best editions are those of Böckh; of Dissen, re-edited by Schneidewin; Bergk (in *Poetæ Lyrici*), and J. Tycho Mommsen (1864).

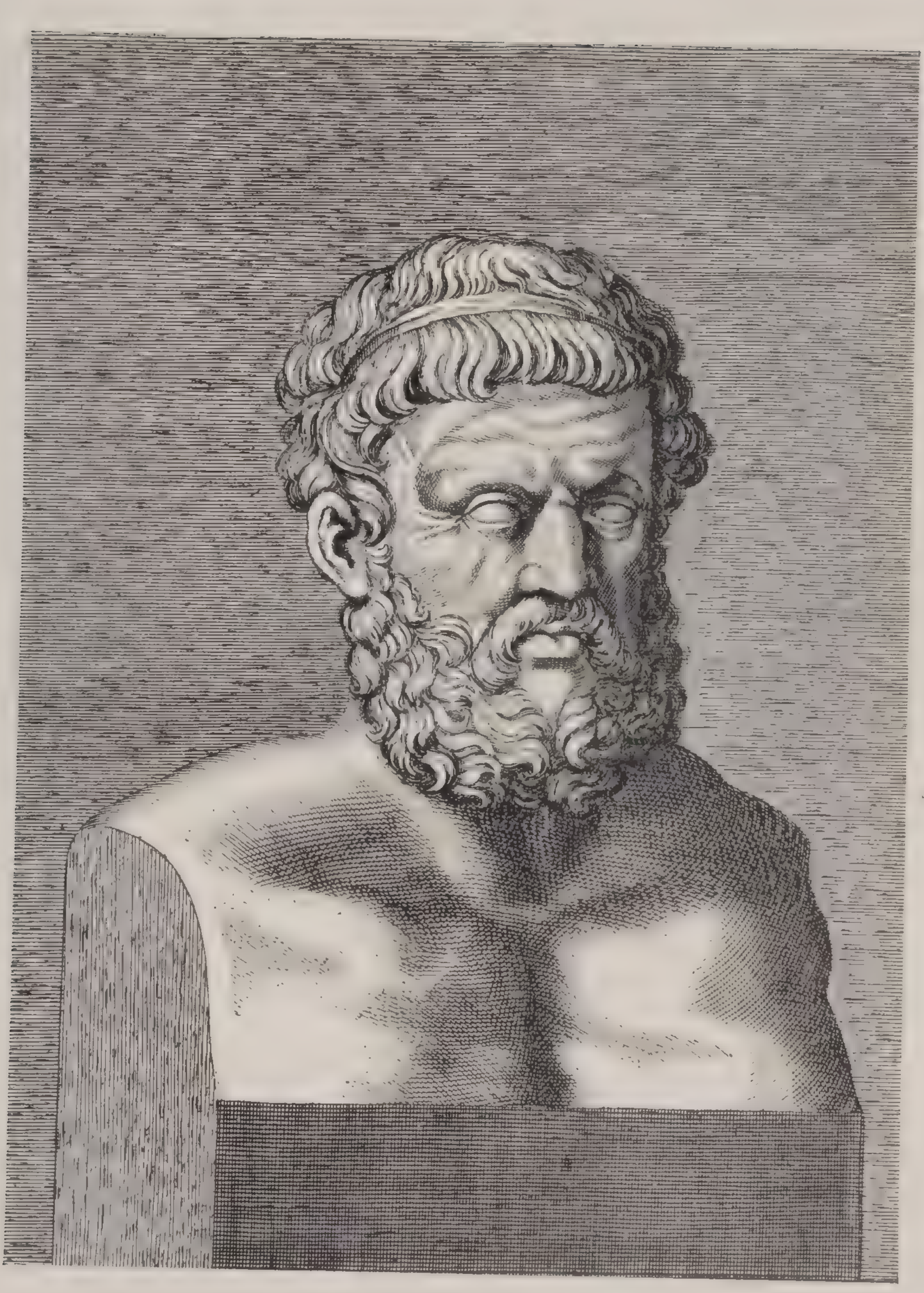
PIN'DAR, Peter: see Wolcot, Dr. John.

PINDAR, or Pinder, n. *pĭn'dėr*, or Pinner, n. *pĭn'nėr* [AS. *pyndan*, to pen up; *pund*, a pound for cattle]: in *OE.*, one who impounds stray cattle.

PINDARIC, a. *pĭn-dăr'ĭk:* after the style of the Greek lyric poet *Pindar*, or in imitation of him; irregular.

PIND DADUN KHAN, *pĭnd dâ-dŭn' ċhân:* town in the Punjab; on a narrow verdant plain on the right bank of the Jhelum, and at the s. base of the Salt Range or Kalabagh Mountains, 110 m. n.w. of Lahore. The town consists of three groups of houses, four m. from the Jhelum. The houses are of mud, but the framework is of cedar-wood. In the vicinity, salt is extensively raised in the Salt Range see Punjab. Total pop. 13,340.

PINDUS, *pĭn'dŭs:* ancient name of a chain of mountains in Greece (q.v.).



PINDAR.

518–439 B. C.

GREATEST LYRIC POET.

PINE, n. *pīn* [F. *pin;* It. or Sp. *pino;* AS. *pín;* L. *pīnus;* Dut. *pijn*, the pine-tree]: coniferous timber-tree of several species characterized by its pin or needle shaped leaves; the *Pīnus sylves'tris*, the Scotch fir; *P. strŏbus*, the white pine; *P. marit'ĭma*, the Bordeaux pine; *P. palus'tris*, the swamp pine (see below). PINY, a. *pīn'ĭ*, abounding with pine-trees. PINEAL, a. *pī'nē-ăl* or *pĭn' ē-ăl* [L. *pīnĕŭs*, of the pine, piny]: pertaining to or like the fruit of a pine-tree. PIN'ERY, n. *-ėr-ĭ*, a hothouse where pineapples are raised. PINEY, a. *pīn'ĭ*, abounding with pines: N. a fat or tallow obtained by boiling the fruit of a tree, *Vatĕrĭă in'-dĭca*, common upon the Malabar coast. PINETUM, n. *pīn-ē'tŭm* [L. *pīnētum*, a pine-wood]: a plantation or wood composed of pine-trees. PINIC, a. *pīn'ĭk*, of or from the pine, applied to an acid obtained from pine-resin. PINE-CLAD, a., or PINE-CROWNED, a. covered with pines. PINE-APPLE, tropical plant (*Ananassa sativa*): also its fruit, of a conical shape—so called from the fruit resembling the cone of the pine-tree (see below). PINE-BARREN, tract of arid land producing pines.

PINE, v. *pīn* [Dut. *pijne*, pain, an ache; *pijnen*, to torture: Ger. *pein*, torture (see PAIN)]: to cause to languish; to droop or waste away under distress or anxiety of mind; to lose flesh or wear away with pain, grief, anguish, desire, and the like: N. in *OE.*, want; suffering of any kind. PIN'ING, imp.: ADJ. wasting away: N. a state of languishing or wasting away. PINED, pp. *pīnd*. PIN'INGLY, ad. *-lĭ.*—SYN. of 'pine, v.': to languish; flag; wither; decay; droop; wear away; waste away.

PINE (*Pinus*): genus of trees of nat. order *Coniferæ*. The Linnæan genus includes all kinds of fir, larch, and cedar; but as now limited, the genus *Pinus* is distinguished by monœcious flowers, and woody cones with numerous two-seeded scales, the scales having an angular truncated apex. The leaves are linear and very narrow, of very dark-green color, growing in clusters or in pairs, and surrounded by scarious scales at the base. To this genus belong many noble and useful trees. They grow mostly in mountainous or other exposed situations, and their narrow leaves are admirably adapted to evade the force of winds, which produce in the tops of pines a peculiar sound, much noticed by the ancient poets, more soft and continuous than in trees of richer foliage. Most of the pines are more or less social, one kind often covering a considerable tract; some of them clothing the sides and even the summits of mountains with magnificent but sombre forests; some growing in lower situations, on otherwise unproductive sandy grounds—e.g., the *Pine Barrens* of N. America. The pines growing in the most barren soils, or in the coldest climates and most exposed situations, are often very small; and though very unlike any other shrubs or bushes, are scarcely to be called trees. Pines are widely diffused over the n. hemisphere, being found on mountains within and near the tropics; and in the colder temperate and the arctic regions descending to the level of the sea.

The SCOTCH P. or SCOTCH FIR (*P. sylvestris*), the only species indigenous to Britain, has leaves in pairs, about an inch and a half long; the cones about the same length, obtuse, and with unarmed scales. On very poor soils and at great elevations it is reduced to a kind of shrub; but in favorable situations it becomes a lofty tree. A plank five ft. and a half in width has been obtained from a Scottish forest. The Scotch P. is of quick growth, but has been known to attain the age of 400 years. Its head is somewhat conical or rounded, and the lower branches die off as the tree grows, leaving the older trees bare of branches for the greater part of their height; but it is more apt to send off large branches than most of the Coniferæ. Immense forests of it exist in some countries of Europe, in some of which it is mingled with the spruce fir. In central and n. Europe and Asia it is found even in plains near the level of the sea, especially where the soil is somewhat sandy; in s. Europe it grows only on mountains. Its timber is highly valuable, being very resinous and durable, and is the *Red Deal* or *Red Pine* used in house and ship-carpentry. There is very great difference, however, in the timber of Scotch P. growing in different soils and situations; rich soils and sheltered situations being unfavorable to the quality of the timber, which becomes white, soft, and comparatively worthless; and of the several varieties of Scotch P., some yield timber much superior to others. One of the best varieties is that which forms the northern Scottish forests, often designated *Braemar P.* by nurserymen. It is remarkable for its very horizontal branches,

Braemer Pine.

and is therefore sometimes called *P. horizontalis.*—The Scotch P. is valuable for other products besides its timber. Common Turpentine is obtained from it, and much Tar, Pitch, Resin, and Lamp-black. (See these titles.) Oil of turpentine is sometimes distilled from the cones, and even from the leaves; the leaves also have been used in Germany for manufacture of a substance resembling tow, and called *Waldwolle* (forest wool), suitable for stuffing cushions, etc. The resinous roots are dug out of the ground in many parts of the Highlands of Scotland, and divided into small splinters, which are used instead of candles. Fishermen, in some places, make ropes of the inner bark; which is applied to a very different use, when most soft and succulent in spring, by the Kamtchatdales and Laplanders, being dried, ground, steeped in water to remove the resinous taste, and used for making a coarse kind of bread.—The Dwarf P. (*P. Pumilio* or *P. Mughus*) is found on the Alps and Pyrenees, its trunk often lying on the ground, though sometimes it appears as a bush or low tree. The recumbent trunks are called *Krummholz* (crooked-wood) and *Knieholz* (knee-wood) by the Germans.—The leaves are in pairs, very like those of the Scotch P., but a little longer; the cones also are similar. By distillation from the young shoots, an oil resembling oil of turpentine is obtained, which is a kind of universal medicine among the peasantry of Hungary, as is also the resin spontaneously exuding from the tree and known as *Hungarian Balsam.*—The Black P., or Black Fir (*P. nigricans*, or *P. Austriaca*), is another species closely allied to the Scotch P., but remarkable for its very long leaves: it is a native of Austria. It abounds in resin more than any other European tree.—To the same group of pines belongs the Seaside or Taurian P. (*P. Pallasiana, maritima*, or *Taurica*), which also affords resin in great quantity, and of very pleasant odor. It is found in many parts of s. Europe. Its timber is of little value; but great part of the turpentine of the *Landes* and other maritime districts of France is obtained from it. It yields also part of the *Burgundy Pitch* of the apothecaries' shops.—The Aleppo P. (*P. Halepensis*), native of s. Europe, Syria, etc., is a very graceful tree of moderate size, with leaves in pairs and slender. It yields a liquid resin or turpentine, sold as *Venice Turpentine.* The wood is extensively used in the Levant for ship-building.—The Laricio (*P. Laricio*) has leaves in pairs, lax, and 4–8 inches long, cones 2–4 inches long, with the scales slightly pointed: it is often called the Corsican Pine. It grows on the shores of the Mediterranean, and is valuable both for its timber and for its resinous products. In the island of Corsica it frequently attains the height of 140 ft. It grows well in sandy soils, and has been made particularly useful for preventing the drifting of the sand, and turning to account the otherwise useless tracts between the mouths of the Garonne and the Adour in France, thus also preserving valuable lands which the sand threatened to overwhelm.—The Pinaster or Cluster Pine (*P. Pinaster*) is another of the most important European species: it has cones in whorls of 3, 4, or even 8 together, 4–6 inches long, leaves in pairs, and very long. It is found on the shores of the Mediterranean, also in the Himalaya and in China. It has been used in France in the same way as the Laricio, for covering waste sandy tracts. The timber is inferior, but great quantities of resin are procured from it. It yields *Bordeaux Turpentine.*—The PYRENEAN P. (*P. Pyrenaica*) is a majestic tree, native of the Pyrenees, and producing very fine timber.—The CALABRIAN P. (*P. Bruttia*) somewhat resembles the Pinaster.—The STONE P. (*P. pinea*), a tree with a broad umbrella-shaped head, a form seen often also in the Scotch fir, forms a characteristic feature of the scenery of the Mediterranean, and is frequently introduced in paintings. It is the *Pinie* of the Germans, *Pignon* of the French. The leaves are in pairs, 4–5 inches long; the cones very large, ovate, and obtuse. The seeds, which do not ripen till the fourth year, are large, abound in a fixed oil, and when fresh, have a sweet taste resembling that of almonds. They are used in Italy and other countries in the same way as almonds and pistachio nuts for the dessert, in various dishes, also in emulsions, etc., under the names of *pinies, pinioles*, and *pignons*. The use of them, however, is almost confined to the countries in which they are produced, as they very soon become rancid. The wood is very useful and beautiful; it yields resinous products only in small quantity.—The CEMBRA P., or SWISS STONE P., which grows in central parts of Europe and s. Siberia—a stately tree, with the lower branches more persistent than

Stone Pine (*P. pinea.*)

in most pines, and rigid leaves in groups of three to five—also produces eatable seeds (*Cembra Nuts*), which, although they are extracted with difficulty, are much used. The cuticle contains a resinous juice; but in Siberia this fruit is so much prized that noble trees are often cut down to obtain it. The Cembra P. yields a pellucid, whitish oil, resembling oil of turpentine, and known as *Carpathian Balsam.*

N. America produces many species of P., some of them very beautiful and very valuable. Besides those long known, found in the states and colonies near the Atlantic, a number of the noblest species of this genus have been discovered in California and n.w. America.—The RED CANADIAN P. (*P. resinosa*) is found from Canada to the Pacific, but not far south in the United States: it is the YELLOW P. of Canada and Nova Scotia. It delights in dry and sandy soils, and attains a height of 70–80 ft., with diameter of two ft. at the base, the trunk continuing of uniform diameter for two-thirds of its length. The leaves are in pairs, and are congregated toward the extremities of the branches. The timber is highly esteemed for strength and durability, and furnishes excellent planks for ship-building: it is used also for masts.—Somewhat resembling this in botanical characters is the NORTHERN SCRUB P., or GRAY P. (*P. Banksiana*), generally only 3–10 ft. high, which begins to appear in the n. parts of the United States upon high mountains. and is interesting as an arctic species, extending further n. than any other.—The YELLOW P. (*P. variabilis*, or *P. mitis*) abounds in the Atlantic states from N. J. to Va. It is a tree 50–60 ft. high, 15–18 inches in diameter at the base, with leaves 4–5 inches long, usually in pairs, but sometimes in threes upon the younger shoots. The timber is extensively used for ship-building, and is largely exported to Great Britain: at Liverpool it is known as NEW YORK PINE.—The JERSEY P., or SCRUB P. (*P. inops*), abounds in the lower parts of N. J., and thence to the southwest. The leaves are in pairs, 1–2 inches long, the cones armed with strong spines. The tree is rarely 30 or 40 ft. high. Great quantities of tar are made from it in Ky.—The PITCH P. (*P. rigida*) is native of the n. and middle parts of the United States, growing often in great miry swamps, and attaining a height of 70–80 ft., and a diameter of two ft. at the base. The leaves are in threes, varying much in length, as the cones do in size. Immense quantities of it are used for fuel. Tar and lamp-black are sometimes made from it. The LOBLOLLY or OLD FIELD P. (*P. Tæda*) grows in dry and sandy soils in lower parts of the southern states, often occupying lands exhausted by cultivation. Vast tracts never cultivated, in the southern states, are *Pine Barrens*, in great part covered with this species. It attains a height of 80 ft. and upward, and has a widespreading crown. The leaves are 6 inches long, in threes, sometimes in fours on young branches; the cones 4 inches high, with strong spines. The timber is not of much value.—The LONG-LEAVED P., or SOUTHERN P. (*P. palustris*, or *P. Australis*), is perhaps the most important

N. American forest-tree. It furnishes the greater part of the tar, resin, pitch, and turpentine used in the United States. The timber also is very valuable, and is much used for ship-building. It is called often GEORGIA PITCH PINE. The tree attains a height of 6–70 ft., and a diameter of about 16–18 inches; the leaves are in threes, and about 12 inches long; the cones 7–8 inches long, and 4 inches in diameter, with small spines. The seeds are sometimes eaten.—The WHITE P. (*P. strobus*), called by the English the WEYMOUTH P., attains a height of 150 ft., and a diameter of 5 ft. and more. It has lax sub-triangular leaves in groups of five; and pendulous cones 4–5 inches long, with thin smooth scales. It is frequently planted in Britain and on the continent of Europe for its beauty. In its native country it abounds chiefly from lat. 47° to lat. 43°, and southward on the Alleghanies. The timber is not strong, but easily wrought and durable.—Another e. species is the TABLE MT. P. (*P. pungens*) of the s. Alleghanies.—Of the species belonging to n. w. America, one of the most magnificent is *P. Lambertiana*, found on the Rocky Mountains, between lat. 40° and lat. 43°, chiefly in sandy soils. It attains a height of 150–200 ft., and a diameter of 7 ft. and more, almost to 20 ft. The trunk is remarkably straight, and destitute of branches for two-thirds of its height; the leaves in fives, the cones more than 12 inches long. The timber is white, soft, and light; and the tree produces great quantities of a pure amber-colored resin, which, when the wood is partly burned, is changed into a somewhat saccharine substance, used by the natives as a sub-

Lambert's Pine (*P. Lambertiana*).

stitute for sugar. The seeds are eaten either roasted or pounded into coarse cakes.—*P. flexilis* is found on the Rocky Mountains, near the head-waters of the Arkansas, and occurs almost to the limit of perpetual snow. It has a dense crown, formed of numerous and remarkably flexile branches. The leaves are in fives. The seeds are used as food by hunters and Indians.—*P. ponderosa*, another native of the Rocky Mountains, is a magnificent tree, remarkable for the heaviness of its timber, which almost sinks in water. The leaves are in threes, and 9–14 inches long.—*P. Sabiniana*, *P. Coulteri*, and *P. insignis*, also are noble species from the w. of N. America.

The Himalaya Mountains abound in pines, some of which rival in magnificence those of n. w. America. The BHOTAN P. (*P. excelsa*), much resembling the white P. in its botanical characters, and attaining a height of 90–120 ft., abounds in Bhotan, though it is not found in the neighboring countries of Sikkim and Nepaul. The wood is highly valuable, being durable, close-grained, and so resinous as to be used for flambeaux and candles.—The CHEER P. (*P. longifolia*) of India is a tree of remarkable and most graceful appearance; with leaves in threes, very long, very slender, and generally pendulous. It is abundant on the crests of hills in the lower Himalaya, growing at a lower elevation than the other pines. It is cultivated in parts of India as an ornamental tree. It is much valued for its resin. The wood is used in India as a substitute for European deal.—The KHASIA P. (*P. Khasiana*) is peculiar to the Khasia Mountains, and has much the general appearance of the Scotch pine.—*P. Gerardiana*, a species with leaves in threes, is a large tree, native of Nepaul. The seeds are eatable.—The mountains of India and of n.w. America produce numerous other species; Mexico has a number of very fine species peculiar to itself; the mountains of St. Domingo have one; the Canary Islands have one; China and Japan also have some. The name P. is often popularly extended, and even in scientific works, to other *Coniferæ*.

PINE-TIMBER.—This term is in general use for the timber of the pine-tribe (see CONIFERÆ), and is not confined to that of the genus Pinus, but embraces the wood of species of Abies, Larix, Araucaria, Dammara, etc. Red and white pine is yielded by the Scotch Fir (*Pinus sylvestris*), and deal timber by the Spruce Fir (*Abies excelsa*). These two, with the Larch (*Larix Europæa*), yield the greatest part of the pine-timber of Europe. Next in importance is the pine timber of the British N. Amer. colonies, which is yielded chiefly by the Weymouth or White Pine (*Pinus strobus*); though, doubtless, the wood of other coniferous trees is often substituted for it. It makes excellent masts; but is not so serviceable for large timbers, as it is subject to dry-rot. The wood has a peculiar odor. Red pine is found from Canada to Pennsylvania; it is intermediate for durability between white pine and pitch pine. (For *Redwood*, see PUGET SOUND.) In 1881 Canada exported to Great Britain timber to the value of £3,876,645. The celebrated pitch pine of Savannah is the product of *Pinus rigida:* it is used for ships' masts and yards, and for purposes requiring great strength and durability, in both of which qualities it excels most others of its kind. The kinds above mentioned are those which constitute the greater part of the pine-timber used in ship and house-building, carpentry, etc., in Great Britain. In France, the timber of the Corsican Pine (*Pinus Laricio*) and the Seaside Pine (*Pinus pinaster*) are greatly used. In Italy the pine-timber is yielded chiefly by the Stone Pine (*P. pinea*) and the Calabrian Pine (*P. Bruttia*); that of Spain is from the Pyrenean Pine (*P. Pyrenaica*). In Germany, and especially in Austria, the Black Pine (*P. Austriaca*) furnishes the greater portion; but the fine-grained, soft white pine, or deal, so much used for sounding-boards of musical instruments, is the wood of the Silver Fir: see FIR. The trade in this timber is very great. The finest is cut in the forests of Bohemia, where large establishments are formed for dressing and preparing the wood for various purposes.

The timber of the Norfolk Island P. (*Araucaria excelsa*) is sometimes exported for ships' masts. The chief value of this class of timber-woods is in the combination of lightness and strength with softness of texture and ease in working with ordinary tools; they are used more than all other kinds of wood together. Much confusion prevails as to their common designations; *fir*, *pine* (and in Britain *deal*) are terms applied to all and each of them, according to the caprice of the individual. The first two names are used because the material is derived from one or other of those genera : but the last is a misnomer altogether, as the term deal belongs only to pieces of fir or pine timber cut to particular sizes : they are three inches in thickness, nine inches broad, and of variable length; if of less width, they are called *battens*.

PINEAL GLAND, or PINEAL BODY, n. *pī'nē-ăl* or *pĭn'ē-ăl* [L. *pīnus*, a pine; *pīnĕus*, of or belonging to a pine]: in the *brain*, small reddish-gray body, of conical form, named from its resemblance to the fruit of the pine. It rests upon the corpora quadrigemina of the brain, in front of the cerebellum. It is about four lines in length, and two to three in width at its base—about the size of a small pea. It is larger in the child than in the adult, and in the female than in the male. It consists chiefly of gray matter, and in its base is a small cavity, which contains a transparent, viscid fluid, in which are granules chiefly of phosphate and carbonate of lime, and termed *acervulus cerebri.* This organ was regarded by some ancient philosophers, also by Descartes, as the seat of the soul.

PINE'APPLE, or ANANAS, *ăn-ā'năs* (*Ananassa sativa*): plant of nat. order *Bromeliaceæ*, highly esteemed, and much cultivated for its fruit. The fruit is a *sorosis,* formed by the calyces and bracts of a close spike of flowers, becoming succulent and combined: this is the distinctive character of the genus *Ananassa.* The P. has a number of long, serrated, sharp pointed, rigid leaves, springing from the root, in the midst of which a short flower-stem is thrown up, bearing a single spike of flowers, therefore a single fruit. From the summit of the fruit springs a crown or tuft of small leaves, capable of becoming a new plant, and much used by gardeners for planting; the P., in cultivation, being propagated entirely by crowns and suckers, as, in a state of high cultivation, perfect seed is almost never produced. The P. is a native of tropical America; it is found wild in sandy maritime districts in the n.e. of S. America, but it has been much changed by cultivation. It has also been gradually diffused over tropical and sub-tropical countries, and not only as a cultivated plant, for it is fully naturalized in many parts of Asia and Africa. It delights in a moist climate, and consequently does not thrive in the dry climate of s. Italy, though the warmth is sufficient. The first particular account of the P. was given by Oviedo 1535. It was cultivated in hot-houses first in Holland; but it was introduced into England in the end of the 17th c., and its cultivation rapidly became general in the gardens of the wealthy. Since the peace of 1815 it has received similar attention in continental Europe. Great care is requisite in its cultivation; otherwise it is generally fibrous and coarse, with little sweetness or flavor; but with careful culture, one of the most delicate and richly flavored of fruits. Its size also depends very much on cultivation. The weight varies from 2½ to 12 lbs.

In the cultivation of the P. in northern countries, a tropical heat must always be maintained. The cultivation is generally in hothouses especially appropriated to it, called *Pineries* or *Pine-stoves ;* sometimes also in flued pits ; sometimes even without fire-heat, in frames continually supplied with fresh tanners' bark and dung. The universal practice formerly was to grow the plants in pots, plunged to the requisite depth in tanners' bark or other fermenting matter ; and these were transferred from one house or one compartment to another, according to their stage of advancement, three years' culture being deemed requisite from the planting of a crown or sucker to the production of the ripe fruit ; but the P. is now often planted in beds, and fruit of the best quality is sometimes obtained in fifteen months. The best soil is a rich and rather sandy loam, formed often from the turf of old pastures, with dung, peat, sand, etc., thoroughly mixed. Ventilation must be freely allowed from time to time, but care must be taken to keep the atmosphere moist. A P. which has borne fruit is thrown away as useless.

There are many varieties in cultivation, differing in the more or less spiny serratures of the leaves, the globular, cylindrical, or pyramidal fruit, its size, etc. A spirituous liquor (*Pineapple Rum*) is made from the P. in some warm countries.—For the use of the fibre of the P., see BROMELIACEÆ.

PINE BLUFF : city, cap. of Jefferson co., Ark. ; on Arkansas river, and on the Pine Bluff and Eastern, the St. Louis Iron Mountain and Southern, and the St. Louis and

Southwestern r.rs.; 46 m. s.s.e. of Little Rock. It has cotton-gins, cotton-seed-oil mills, grist and planing mills, and car shops. Extensive shipments of cotton and hides are made.—Pop. (1890) 9,952; (1896) estimated 13,000.

PINE′-CHAFER, or **PINE′-BEETLE** (*Hylurgus piniperda*): small coleopterous insect of family *Xylophagi:* see BARK BEETLE. It is often very destructive to Scotch firs in rich soils and low situations, attacking the young terminal shoot in summer, and soon eating its way into the heart, which it proceeds to excavate, converting the shoot into a tube. Pines in open situations are little liable to the attacks of this insect; and trees 30 ft. in height, or upward, are very rarely attacked. The insect is about the size of a seed of the Scotch fir, and of black or dark-brown color.

PINE′-FINCH, or **PINE′-GROSBEAK** (*Pinicola*): genus of birds of family *Fringillidæ*, nearly allied to bullfinches and crossbills, the bill nearly resembling that of the former, but the tongue very similar to the tongue of the crossbills, with the same peculiar bone articulated to the hyoid bone: see CROSSBILL. One species, the COMMON P.-F. (*P. enucleator*), is abundant in many n. parts of Europe, Asia, and America. It is larger than a bullfinch, but much resembles the bullfinch in form, wings, tail, etc. The general color of the male is red. This bird frequents pine-forests, and associates in flocks in winter. It is easily tamed. Its song is rich and full.—There are other species in northern regions.—The name P.-F. is given in N. America to a very different and much smaller bird (*Chrysomitris pinus*), the P.-F. Linnet or American Siskin.

PINEL, *pe-nĕl′*, PHILIPPE: French physician: 1745, Apr. 20—1826, Oct. 26; b. Saint-André, dept. of Tarn. After a good classical education at the College of Lavaur, he removed to Toulouse, where he studied medicine, and took his degree 1773. He continued his medical studies at Montpellier, maintaining himself meantime by teaching mathematics; and 1778 removed to Paris, where he acquired some reputation by a translation into French of Cullen's *Nosology* (1785), and by Memoirs on zoology and comparative anatomy. Having applied himself with success to the study of mental alienation, he became chief physician of the Bicêtre (insane asylum) 1793; and 1795 was chosen to the same office at the Salpêtrière (similar asylum, for females). In the latter institution P. commenced a class of clinical medicine, which he continued after his appointment to the chair of medical physics and hygiene, and subsequently that of pathology, at the School of Medicine in Paris. He was admitted as a member of the Institute 1803. He died at Paris. His most valuable works were his *Traité Medico-philosophique de l'Alienation Mentale* (1791), and *La Nosographie Philosophique* (1798), with its commentary, *La Médecine Clinique* (1802). P. gained undying fame by his reformation of the old barbarous methods of treating the insane. The physicians brought up under the old system offered vigorous opposition to his philanthropic views: but his system in a few years prevailed throughout Europe.

PINENCHYMA, n. *pĭ-nĕng'kĭ-mă* [Gr. *pinax*, a tablet; *eng'chuma*, an infusion, substance of organs—from *eng'cheō*, I infuse]: in *bot.*, a cellular tissue of plants arranged in a tabular form: other spelling, PINAKENCHYMA.

PINEROLO, *pē-nā-rō'lō*, or PIGNEROL, *pēn-yėr-ol'*: town in n. Italy, on the Clusone, at the entrance of the valley of Perosa, in the province of Turin, 23 m. by railway s.w. of the city of Turin. It was formerly strongly fortified, and was the residence of the rulers of Piedmont. It contains a new cathedral, a bishop's palace, seminaries, barracks, etc. The ruins of the *citadel*, for some time the prison of the *Man with the Iron Mask* (q.v.), are still seen on the hill of St. Brigide. Broadcloth, paper, leather, iron, and silk, are manufactured. Pop. 12,000.

PINES, ISLE OF (W. Indies): see ISLA DE PINOS.

PINES, ISLE OF (or KUNIE, *kū-nē'*): island in the s. Pacific; lat. 22° 38′ s., long. 167° 25′ e.; 42 m. in circumference: discovered by Capt. Cook 1774; it belongs to France, and is a dependency of New Caledonia. The scenery is very picturesque; but the soil barren except near the coast. The island is a French convict settlement. Pop. 2,500.

PINE-SNAKE (*Pityophis*): genus of large harmless snakes, represented in the United States by the P.-S. or Bull Snake (*P. Melanoleucus*), white with black-margined brown blotches, in a triple series; length 5 ft.; found in Ohio, w. and s.: and by the Western P.-S. (*P. Sayi*), whitish or reddish, with many dark blotches or spots in a like series; length 4–6 ft.; found eastward as far as Wisconsin. The Bull Snake is common on the prairies, but the species take their name from occurrence in pine-woods. The genus has the dorsal scales carinated; anal plate entire; 200–240 gastrosteges.

PINE'-WOOL: fibrous substance, product of pine-leaves in some countries. Several attempts have been made of late years to utilize the leaves of pine and fir trees, cut down in vast numbers for their timber only. The leaves contain a fine vegetable fibre, which has much the appearance of cotton. In Germany, several works have been established for preparing this fibre; and it is now sold for stuffing cushions, making wadding, etc. The principal manufacture is near Breslau in Silesia.

PIN-EYED, a. *pĭn'īd* [*pin*, and *eye*]: in *bot.*, applied to those flowers in Primula which have a long style with the stigma visible at the top of the floral tube: opposed to *thrum-eyed.*

PI'NEY TREE: see CALOPHYLLUM.

PI'NEY-VARNISH: see DAMMAR.

PINFOLD, n. *pĭn'fōld* [Dut. *pand;* Ger. *pfand*, a pawn or pledge: Ger. *pfandstall*, a pinfold (see PINDAR)]: a place in which cattle straying and doing damage are temporarily confined or impounded; a pound.

PING, n. *pĭng* [Low Ger. *pingeln*, to ring; *pingel*, a bell]: the sharp sound of a bullet flying past.

PINGUIC'ULA: see Butterwort.

PING-YANG', or Pieng-an': see Kang-hoa.

PINHO'EN, Oil of: see Physic Nut.

PINION, n. *pĭn'yŭn* [L. *pinna*, a feather: F. *penne*, *pennon;* It. *pinna;* F. *pignon*, a pinion in wheelwork]: the last joint of a bird's wing; the whole wing of a bird; a small wheel with flaps or leaves working in another similarly constructed: V. to bind or confine, as by fastening the wings, or by binding the arms or elbows together. Pin'ioning, imp. Pin'ioned, pp. *-yŭnd*, fastened by binding the arms or elbows together.

PINITE, n. *pĭn'ĭt* [from *Pini*, in Saxony, where first found]: an alkaline variety of the mineral iolite, of a dirty-gray, green, or brown color.

PINITES, n. plu. *pĭn'īts* [L. *pīnus*, the pine-tree]: a general term for all fossil wood which exhibits traces of having belonged to the pine tribe.

PINK, v. *pĭngk* [AS. *pyngan*, to pierce: F. *piqué*, pierced or thrust into: Gael. *punc*, a point: Gael. and Ir. *pioc;* W *pigo*, to prick, to sting: L. *pungo*, I prick]: to work eyelet-holes in; to pierce or punch with small holes; to stab. Pink'ing, imp.: N. a method of ornamentation by stamping or cutting the edges of dress materials or leather in a variety of shapes. Pinked, pp. *pĭngkt*. Pink-needle, a shepherd's bodkin. Pinking-iron, a tool for cutting out by a blow scallops at the edges of ribbons and cloth Pink'd porringer, in *Shakes.*, a cap ornamented with eyelet-holes.

PINK, n. *pĭngk* [F. *pinque;* Dut. *pink*, a fishing-boat, a merchant vessel: comp. Icel. *espingr*, a long boat]: a narrow sterned vessel.

PINK, v. *pĭngk* [Dut. *pinken*, to wink or leer: comp Eng. *blink*, and Ger. *blicken*, to wink, to glitter]: to wink. Pink-eyed, a. [O.Dut. *pinck-oogen*, to shut the eyes]: having small, winking, inflamed eyes.

PINK, n. *pĭngk* [F. *pince*, a tip or thin point; *pinces*, the flower pink]: flower of a brilliant color—so called from its sharp-pointed and somewhat rigid leaves; various species of the genus *Dian'thus* (see Pink, below): light-red color (see Pink Colors): anything supremely excellent—from the *pink* being taken as the type of a flower, as 'pink of courtesy,' 'pink of perfection,' the latter used in a slightly depreciatory sense: Adj. of the color of *pink*. Pinkroot, the root of a species of pink of India, etc., used in medicine (see Spigelia). Pink-saucer, a saucer having its inner surface covered with a pink coloring matter, used in coloring small articles. *Note.*—The preceding four entries are all connected in derivation, the fundamental idea being anything pointed and sharp—see Latham and Skeat: the probable root is Gael. *pic*, a peak.

PINK (*Dianthus*): genus of plants of nat. order *Caryophyllaceæ*, of which there are many species, annuals and perennials, with beautiful and often fragrant flowers, natives chiefly of Europe and temperate parts of Asia. The calyx is tubular, 5 toothed, with two or four scales at the base; there are 5 petals suddenly contracted at the throat of the corolla into a linear claw. There are ten stamens, and one germen with two styles. The capsule is cylindrical, and one-celled. The exquisite beauty of the flowers has attracted admiration in all ages; and some of the species have long been much cultivated in gardens, particularly the GARDEN P. and CARNATION (q.v.), which are referred often to one original, the CLOVE P. (*D. caryophyllus*), native of s. Europe, growing wild on rocks and old walls; while some botanists refer the garden pinks in part to the MAIDEN P. (*D. deltoides*), and those called Pheasant-eye pinks to the FEATHER P. (*D. plumarius*), native of parts of continental Europe, differing from the Clove P. chiefly in having the leaves rough on the margin, and the petals bearded and much cut. Nearly allied to them is *D. superbus*, found in moist places in parts of Europe, and frequent in flower-borders: it has very fragrant flowers. All the varieties of Garden P., whatever their origin, have been much changed by cultivation, and careful cultivation is requisite to preserve them in perfection. Both single and double pinks are propagated generally by *pipings*, which are short cuttings of the younger shoots. They are also propagated sometimes by layers. A rich loamy soil is best for pinks. The Clove P., in a wild state, has flesh-colored flowers: the leaves are linear-awl-shaped, grooved, and glaucous. The Maiden P. is a small, much-branched plant, growing in grassy places, on gravelly and sandy soils; it has rose-colored flowers spotted with white, and a white eye encircled by a deep purple ring.—The Deptford P. (*D. Armeria*) and the CLUSTERED P., or CHILDING P. (*D. prolifer*), differ from these in being annuals, and in having clustered flowers. The last two have become naturalized in the e. United States—*D. prolifer* near Philadelphia.—The WILD P. of N. Amer. is *Silene Pennsylvanica*, and the FIRE P. (one of the 'catchflies') is *S. Virginica*.—The GROUND or MOSS P. (*Phlox subulata*), forming beautiful mats in rocky places, and the American Sweet Williams of the same genus, belong to the family *Polemoniaceæ*.—The BEARDED P., or SWEET WILLIAM (*D. barbatus*), native of middle Europe and s. France, with lanceolate leaves, flowers crowded in dense clusters at the top of the stem, acuminated bracts, and bearded petals, has long been a favorite garden-flower, still retaining its place alike in palace and cottage gardens. Although perennial, it is sown annually by florists, to secure fine flowers, and there are many varieties, single and double, exhibiting much diversity of color.—The INDIAN P., or CHINA P. (*D. Chinensis*), also is common in flower-gardens.

The Clove P. was formerly regarded as possessing medicinal properties, and was used in nervous maladies.—*Sea P.* is a common name of Thrift (q.v.).

PINK COLORS: very light shades of rose-red color: produced usually by extreme dilution of cochineal or carmine, Brazil and Braziletto wood colors, with whiting. Some mineral pinks for oil colors are obtained from preparations of manganese, etc.: see RED COLORS. The term pink is applied also to several Yellow Colors (q.v.).

PINKERTON, *pingk'ėr-ton,* ALLAN: detective: 1819, Aug. 25—1884, July 1; b. Glasgow, Scotland. He learned the cooper's trade, went to Montreal 1840 to avoid imprisonment for advocating chartist principles, and soon removed to Chicago. He became deputy-sheriff, was appointed detective by the city govt. of Chicago 1850, and established his famous detective agencies in large cities (see DETECTIVES). He discovered and frustrated the plot to assassinate Pres.-elect Lincoln on his way to Washington, and organized and was the first chief of the secret service force in the Union army. He broke up many gangs of desperate criminals, including the Mollie Maguires, and recovered large sums of money from bank robbers. His literary work was confined to detective stories, of which about 15 were published. He died at Chicago.

PINK'ERTON, JOHN: industrious and learned *littérateur:* 1758, Feb. 17—1826, Mar. 10; b. Edinburgh. He was educated at the grammar school of Lanark, and was apprenticed to a writer to the signet. In 1780 he settled in London as a man of letters. In the next three years he published collections of *Scottish Ballads,* professedly ancient; but many were really his own compositions—*forgeries,* some might say. His *Essay on Medals,* 1784, long held a high place among books on numismatics. *Letters on Literature,* 1785, were marked chiefly by novel and absurd orthography. P.'s most valuable publication was *Ancient Scottish Poems never before in Print, from the MS. Collections of Sir Richard Maitland of Lethington, Knight* (2 vols. Lond. 1786). His *Dissertation on the Origin and Progress of the Scythians or Goths,* 1787, is notable for grotesquely virulent hatred of the Britanno-Celtic race—Scotch Highlanders, Welsh, and Irish—that reaches its absurd and savage climax in his *Inquiry into the History of Scotland preceding the Reign of Malcolm III.* (2 vols. Lond. 1790): nevertheless the *Inquiry* contains much important matter—rare and curious historical documents, some of which are found nowhere else in print. P. died in Paris, whither he had removed 1802. He published many other historical, geographical, and antiquarian works: among these is *The History of Scotland from the Accession of the House of Stuart to that of Mary* (2 vols 1797), valuable for laborious investigation of original materials, but disfigured by an imitation of the grandiose style of Gibbon. His *Walpoliana* was a collection of his friend Horace Walpole's conversations, 2 volumes.

PINK-EYE: form of influenza, affecting horses. It is accompanied by debility, congestion of the blood-vessels of the eyes, with watery discharge therefrom, swelling of the limbs, staring coat, poor appetite, and general derangement of the digestive functions A nasal discharge usually commences in a few days. The subject should be promptly isolated, have perfect rest, pure air, a moderate degree of light, plenty of water from which the chill has been taken, and a rather spare diet. If the limbs are cold they should be rubbed, and flannel bandages are sometimes required. In severe cases a veterinarian should be called, as serious complications are liable to occur.

PINKNEY, *pĭngk'nĭ*, WILLIAM, LL.D.: statesman: 1764, Mar. 17—1822, Feb. 25; b. Md. He studied law, and became eminent as a practitioner. He was a member of the Md. convention 1788, to ratify the federal constitution; a state councilor, member of the state house of delegates, and state senator. He was a commissioner to England under the Jay treaty, 1796. In 1805 he was atty.gen. of Md. In 1806 he went to England as minister extraordinary, and was minister resident at the court of St. James 1807–11. He served as atty.gen. of the United States 1811–18. In the war of 1812 with England P. commanded a corps of volunteers, and was severely wounded at the battle of Bladensburg. In 1815 he was elected to congress, and 1816 was appointed by the pres. minister to Russia. In 1819 he was elected senator of the United States. P. had unusual legal ability, and natural gifts as writer and orator.

PIN'NA: genus of lamellibranchiate mollusks of the same family with the *Pearl Mussel* (*Aviculidæ*), and having a shell of two equal wedge-shaped valves, closely united by a ligament along one of their sides. The mantle is closed on the side of the ligament; the foot is small and conical. The byssus is remarkably long and silky; and by it the species affix themselves to submarine rocks and other bodies, sometimes even to sandy or muddy bottoms. The best known species is *P. nobilis*, native of the Mediterranean, the byssus of which was used by the ancients for fabrics, but chiefly as an article of curiosity, to which a great value was attached. It is still so used in Sicily and elsewhere. It is very strong and lustrous. The only reason against its more general use is the difficulty of procuring it in sufficient quantity. The byssus of this species is sometimes two ft. long, the shell is about the same length. Pinnæ are found often in large beds, with only the edges of their shells appearing above the mud or sand. The animal is eaten.

PINNA, n. *pĭn'nă*, plu. PINNÆ, *pĭn'nē* [L. *pinna*, a feather]: in *science*, a name applied to the fin of a fish, or to the feather or wing of a bird; in *anat.*, the part of the external ear which projects beyond the head; in *bot.*, the leaflet of a pinnate leaf.

PINNACE, n. *pĭn'nās* [Sp. *pinaza;* F. *pinasse;* It. *pinassa*, a small vessel—from L. *pīnus*, a fir-tree, because originally constructed of pine-wood]: originally a small vessel, usually schooner-rigged, but capable of being propelled by oars; employed as tender to a large ship, for communicating with the shore, etc. At present, however, the signification is frequently a large boat carried by great ships; smaller than the launch, but larger than the cutter; and generally rowed 'double-banked,' with 8 to 16 oars. In poetry, P. is any light vessel.

PINNACLE, n. *pĭn'nă-kl* [F. *pinacle*—from It. *pinacolo*, a pinnacle, a battlement: L. *pinnaculum*, a pinnacle—from *pinna*, the fin of a fish, a feather, a pinnacle]: slender turret elevated above the main building; the highest point or part of a building: V. to furnish with pinnacles. PIN'NACLING, imp. *-klĭng*. PIN'NACLED, pp. *-kld:* ADJ. furnished with pinnacles.—*Pinnacle* is an ornamental termination much used in Gothic architecture. It is of simple form in the earlier periods of the style; having a plain square or octagonal shaft and sloping roof or top, terminating with a finial; but in later examples, the pinnacle is greatly developed, and becomes one of the most varied and beautiful features of the style. It is ornamented with shafts bearing canopies, and niches filled with statues. Pinnacles are most frequent on buttresses and parapets; on buttresses, they serve as a deadweight to increase their power of resisting a thrust.

PINNATE, a. *pĭn'nāt*, or PIN'NATED, a. *-nā-tĕd* [L. *pinnātus*, feathered—from *pinna*, a feather or fin]: in *bot.*, a compound leaf having several leaflets attached to each side of a central rib; feathered; winged or lobed. *Note.*—If the leaflets are in pairs, they are equally—that is *pari-pinnate;* if terminated by an odd leaflet, they are unequally—that is, *impari-pinnate.* PINNATIFID, a. *pĭn-năt ĭ fĭd* [L. *findo*, I cleave; *fidi*, I have cleft]: applied to leaves divided into segments or jags like those of the common groundsel. PINNAT'IPAR'TITE, a. *-pâr'tīt* [L. *pars*, or *partem*, a part]: in *bot.*, applied to a simple leaf cut into lateral segments, the divisions extending nearly to the central rib. PINNAT'IPED, a. *-pĕd* [L. *pes*, or *pedem*, a foot]: having the toes bordered by membranes, as some birds; fin footed. PINNIPED, a. *pĭn'ĭ-pĕd*, applied to certain crabs that have their hinder feet flattened like a fin for swimming. PINNAT'ISECT, a. *-sĕkt* [L. *sectus*, cut]: applied to a simple leaf divided to the midrib in a pinnate manner.

PINNER, n. *pĭn'ėr* [see PIN 1]: a pinafore; an apron with a bib pinned in front of the dress; the loose lappet of a head-dress.

PINNIGRADE, a. *pĭn'nĭ-grād* [L. *pinna*, a feather or fin; *grădior*, I walk]: denoting one of the group of the PIN'NIGRA'DA, *-grā'dă*, moving on short feet that serve as paddles, including seals and walruses; fin footed.

PINNIPEDIA: same as PINNIGRADA: see SEAL.

PINNULATE, a. *pĭn'nū-lāt* [L. *pin'nula*, a little fin or feather]: applied to a leaf when its leaflets are again subdivided. PINNULE, n. *pĭn'nūl*, in *bot.*, one of the leaflets of a pinnate leaf, or of one which is bipinnate, tripinnate, etc.: see LEAVES. The term is in more frequent use, however, to designate the ultimate divisions of the fronds of ferns, when divided in the same manner.

PINOLE, n. *pĭn-ōl'* [Ital.]: an aromatic powder used in Italy for making chocolate; the heart of maize baked, ground, and mixed with sugar. It is dissolved in water to form a beverage.

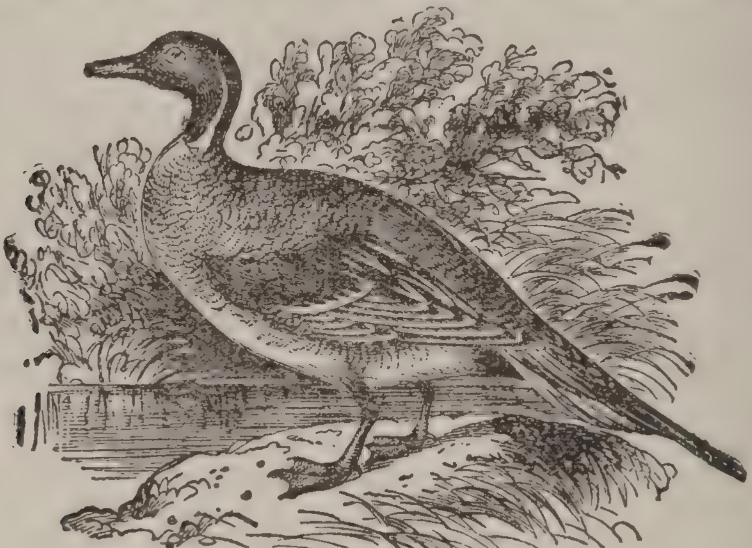
PINOLIN, n. *pĭn'o-lĭn* [L. *pinus*, *oleum*]: in *chem.*, a volatile oil produced by the distillation of American pine-resin, and used as an illuminating material.

PINSK, *pĭnsk:* town of w. Russia, govt. of Minsk, surrounded by vast marshes called the P. Marshes; on the banks of the Pina, a branch of the Pripet; 752 m. s.s.w. of St. Petersburg, lat. 52° 7′ n., long. 26° 6′ e. It was founded in the 12th c., was conquered by the Prince of Lithuania 1320, was annexed, with Lithuania, to Poland 1569, and came at last into the possession of Russia 1795. The trade of P., chiefly transit, has increased, especially since the opening of the Oghinsky canal, which connects the Dnieper and the Black Sea with the Niemen and the Baltic Sea. A considerable number of ships and barges enter and clear the port, laden principally with salt, corn, hemp-seed, iron, glass, tar, tallow, wool, tobacco, and timber. The manufacturing activity is not great. The project for a branch line of railway (55 m.) connecting P. with the main line to Minsk, has been sanctioned. Of the people, three-fourths are Jews, and have the trade almost entirely in their own hands. Pop. (1890) 32,480; (1897) 27,938.

PINT, n. *pīnt* [Sp. *pinta*, a spot or mark, a pint—from *pintar*, to paint: Dut. *pint;* F. *pinte*, a pint: L. *pictus*, painted—from *pingĕrĕ*, to paint: measure so called because marked or pointed off in the interior of a larger measure]: measure of capacity used both for liquid and for dry substances, and equivalent to the eighth part of a Gallon (q.v.), or 34·65925 cubic inches. The Scotch pint, still in use, though superseded as a legal measure, is equivalent to 3·00651 pints.

PINTA'DO: see GUINEA FOWL.

PIN'TAIL, or PINTAIL DUCK (*Dafila*): genus of ducks, of the section with the hind-toe destitute of membrane. The bill is without tubercle at the base, narrow, with laminæ not projecting beyond the margin. The tail of the male is long, and tapers to a point.—The COMMON P. (*D acuta*) is a handsome bird, rather longer in shape than most of the ducks; the neck also longer and more slender. It is about equal in size to the mallard. The head of the male is rich dark brown, with a white longitudinal line on each side down the neck; the back and sides marked with waving lines of black and grayish-white; the lower parts white; the elongated central tail-feathers black; feet grayish-blue. The young and the female have the whole head and neck finely marked with brown, the back with light angular or rounded bars on each feather. It is a native of all n. parts of the world, migrating southward in winter. It also frequents fresh-water lakes and ponds, and is common in winter in the lower valley of the Mississippi. Its winter range extends southward to the Mediterranean and the Gulf of Mexico, and even to Africa and the W. Indian Islands. Its flight is very rapid and noiseless. It is esteemed for the table. It has been tamed, and has bred in confinement.



Pintail Duck (*Dafila acuta*), Male.

PINTARD, *pĭn-târd'*, JOHN, LL.D.: 1759, May 18—1844, June 21; b. New York. He graduated from Princeton College 1776 ; was connected with the commissary department of the revolutionary army, and afterward engaged in the shipping business. He was a member of the N. Y. legislature 1787, for a short time edited the *Daily Advertiser*, visited Louisiana, and was influential in securing its purchase by the govt., engaged in the insurance business, organized the first savings-bank in New York, was sec. of the chamber of commerce, was one of the founders of the historical societies of N. Y. and Mass., and of the American Bible Soc., and was connected with other important public enterprises. He wrote for periodicals and translated into French the *Book of Common Prayer*. He died in New York.

PINTLE, n. *pĭn'tl* [dim. of PIN, which see]: a little pin; a long iron bolt to prevent the recoil of a cannon.

PINTLE, n. *pĭn'tl* [a corruption of *pen'dulum*, in the sense of that which is hung—from L. *pendĕo*, I hang]: in a *ship*, a hook on which a rudder is hung to its post.

PINXIT, v. *pĭngks'ĭt* [L. he painted it]: word appended to a picture or engraving with the artist's name prefixed, as Vandyke *pinxit*, painted by Vandyke.

PINY : see under PINE 1.

PINZON, *pēn-thōn'*, **Martin Alonzo**: navigator: 1441–93; b. Palos de Moguer, Spain. After becoming a skilful pilot he engaged with his brothers in ship-building. While at Rome on business he heard of and investigated the claims of Columbus concerning the new world. He favored the proposed plan, aided in fitting out the expedition of discovery, and commanded one of the vessels, but caused much trouble by his jealousy and insubordination. On the return trip he separated from Columbus and endeavored to reach home, report the discovery of land, and claim the honor therefor before the latter should arrive. Being detained by a storm he did not reach Palos till a few hours after Columbus had landed. His conduct on the voyage and his effort to supplant his commander becoming known, he was not allowed to appear at court. He died soon after his return to Spain.—His brother, **Francisco Martin P.** (about 1462–1500); b. Palos de Moguer, Spain. He was a pilot on the ship commanded by his brother, Martin Alonzo P., in the expedition under Columbus which discovered the new world, and was equally opposed to the great discoverer. He succeeded his elder brother as manager of the ship-building business in which they had been engaged; and 1499 was a pilot in the expedition which resulted in the discovery of Brazil. He was lost with his ship and all on board while on the homeward voyage.

PINZON, *pēn-thōn'* (or **Pinçon**), **Vicente Yañez**: discoverer of Brazil: one of three brothers born in Spain about the middle of the 15th c. and associated with Columbus in his discovery of America. Vicente commanded the *Nina*, besides giving material assistance to Columbus. He sailed from Palos 1499, Nov. 13, with four caravels, and reached Cape St. Augustine, the easternmost point of the S. American continent, 1500, Jan. 20. Following the coast as far as the mouth of the Orinoco and entering the mouth of the Amazon, he took possession of the country in the name of Spain, and then followed the coast-line n.w. as far as Costa Rica, and touched at Hayti, losing two of his vessels among the Bahamas. He returned to Spain 1500, Sep. Concessions were made to him by the Spanish crown, and he was created gov. of the territory discovered; but he did not take possession. He sailed along the e. coast of S. America with Juan Diaz de Salis 1508, in hope of finding a w. passage to the Spice Islands; but they were unsuccessful. All record of him is lost after 1523.

PIOMBINO, *pē-ōm-bē'nō:* principality now incorporated in the kingdom of Italy; along the Italian coast opposite the island of Elba, the greater part of which belonged to it: extent about 132 sq. m.; pop. previous to its incorporation with the rest of Italy, about 25,000. P. was originally a fief of the empire, and, at the end of the 14th c., came into the possession of the family of Appiani, which, after ruling it nearly 300 years, made way for a new dynasty, the family of Buoncompagni. This latter dynasty was mostly under the suzerainty of the neighboring states of Sardinia and Naples alternately. In 1801 the Buoncompagni family were expelled by Napoleon, and the principality given to his sister Elisa, wife of Felice, Prince Baciocchi; but the latter was ejected, and the old dynasty restored, by the congress of Vienna; the principality being then put under the suzerainty of Tuscany, whose grand-duke indemnified the Buoncompagni for their loss of sovereignty. It is now part of the province of Pisa, in the kingdom of Italy. The strait between P. and Elba is called the 'Channel of Piombino.'

PIONEER, n. *pī'ŏ-nēr'* [F. *pionnier*, a pioneer: OF. *peonier*, a foot-soldier: Sp. *peon;* F. *pion*, a day-laborer, a pawn in chess: mid. L. *pedōnēs*, foot-soldiers]: one of a company of soldiers trained to work with pickax, spade, etc., and employed in the field to clear the road before an army, throw up works, dig trenches, build bridges, etc.; one who goes before to prepare the way for another: V. to clear the way for. PI'ONEER'ING, imp. PI'ONEERED', pp. *-nērd'*.

PIONY, n. *pī'ŏ-nĭ:* the *peony*, which see.

PIOTRKOW, *pē-otr'kov:* capital (since 1867) of one of the 10 govts. into which Poland was then divided. It is near the Warsaw and Vienna railway. It is one of the oldest Polish towns; here in the 15th and 16th c. diets were held, and kings elected. In 1702 P. was burnt by the Swedes; in 1709 the Russians gained a battle here. Pop. (1880) 18,000; (1885) 24,866.

PIOUS, a. *pī'ŭs* [OF. *pieus*, and *pius;* Sp. and It. *pio;* F. *pieux*—from L. *pĭus*, pious]: devout; religious; done under the guise of religion, in an ill sense, as a pious fraud. PI'OUSLY, ad. *-lĭ*. PI'OUSNESS, n. *-nĕs*, the quality of being pious. PIETY, n. *pī'ĕ-tĭ*, which see PIOUS-MINDED, a. disposed to reverence and honor the Supreme Being; of a pious disposition.—SYN. of 'pious': holy; godly; righteous.

PI'OUS-BELIEF', or PIOUS-OPINION, in Rom. Cath. Theol.: belief or opinion universally or almost universally prevalent in the church as to some event or theological proposition, concerning which no definition has been made. The Assumption of the Virgin Mary is an example.

PIOZZI, *pē-ŏz'ĭ*, It. *pē-ŏt'sē*, HESTER LYNCH (SALUSBURY): [THRALE]: a woman not to be forgotten while Dr. Samuel Johnson is remembered: 1739—1821, May 2; b. Bodvel, in Caernarvonshire, Wales; daughter of John Salusbury. Early introduced into the fashionable world of London, she charmed by her beauty and her lively manners; and, 1763, was married to Henry Thrale, a rich brewer, with a recognized position in society, and, at the time, one of the members for the borough of Southwark. Her acquaintance with Dr. Johnson, which speedily became an affectionate intimacy, began shortly afterward. Of all Johnson's many friendships, this was, in some essential respects, the most valuable to him. To Johnson, widowed and alone, and subject, as he had ever been, to accesses of a frightful gloomy hypochondria, which made life at times to him an almost intolerable burden, the society of Mrs. Thrale, and of the circle which she gathered round her, was an incalculable solace. Mrs. Thrale in particular, with her warm heart, and bright womanly intelligence, was always a comforting presence; and her unfailing cheerfulness and vivacity enlivened for him many an otherwise cloudy hour. Her married life, though prosperous, was not eminently happy, Mr. Henry Thrale, though always pleasant and kindly, being no specimen of conjugal virtue. Though Johnson owed her much, it may be surmised that the benefit was in some sort reciprocal, and that, by her affectionate reverence and solicitude for her sage, she consoled herself for the gentlemanly indifference of her husband. On the death of her husband, 1781, Mrs. Thrale retired with her four daughters to Bath, where, 1784, she married Gabriel Piozzi, Italian teacher of music. This *mésalliance*—as it was held—was deeply censured by all her friends, and so unreasonably excited the ire of Dr. Johnson in particular, that a rupture of friendly relations was the result. In the correspondence between them on the subject, it must be admitted the lady has much the better of the philosopher, whose tone of unmannerly rudeness gives some countenance to the good-natured suspicion of his friends that he had an eye to the widow himself. Though the feud was ostensibly healed, the friends never again met; Mrs. P. leaving England for Italy with her husband, and Dr. Johnson dying soon after. A little time after Johnson's death she published an octavo volume, *Anecdotes of Dr. Samuel Johnson during the Last Twenty Years of his Life*, in which it seemed to the indignant Boswell and others that her main intention was to take her little feminine revenge on the deceased for his outrage in the matter of Piozzi. This work she supplemented 1788 by a collection of *Letters to and from Dr. Samuel Johnson*, 2 vols. 8vo. Her other books have long since been utterly forgotten. Having survived her second husband, her own celebrity, and almost that of the great Dr. Johnson, Mrs. P. died at Clifton, near Bristol.

PIP, n. *pĭp* [a contraction of PIPPIN, which see: F. *pepin*, the seed of fruit, as of an apple or grape]: the seed of an apple, orange, and the like; a cherry-stone; the spot or single on a card: V. to cry as a chicken. PIP'PING, imp. PIPPED, pp. *pĭpt.* PIP, a spot on cards, is referred to OF. *picque*, a spade at cards—see Skeat.

PIP, n. *pĭp*, or CHIP, or ROUP [Ger. *pipps;* Dut. *pipse*, the mucus of the nose: F. *pepie;* It. *pipita*, pip—from L. *pitŭĭta*, phlegm, gummy moisture]: disease of poultry, often very fatal, particularly to chickens and turkey poults; frequent also in young pheasants. Adult birds are liable to it; and when it appears in a poultry yard, it often attacks many in rapid succession, so that it is regarded as highly contagious. It most frequently occurs in wet or very cold weather, and is described generally as a kind of catarrh, though perhaps it might be called more accurately a kind of influenza. It begins with a slight hoarseness and catching in the breath, followed by offensive discharge from the nostrils and eyes, rattling in the throat, and an accumulation of mucus in the mouth, forming a 'scale' on the tongue. The communication of the disease from one bird to another is supposed to take place through the contamination of the water in their common drinking-vessel; therefore a bird affected with it should at once be removed from the rest. Castor-oil is freely administered by some poultry-keepers. *The Henwife* recommends also a medicine composed of half a drachm of dried sulphate of iron, and one drachm of capsicum, made into 30 pills with extract of licorice—one pill to be given three times a day. This after a time is to be followed by another compound of sulphate of iron, cayenne pepper, and butter. The eyes, nostrils, and mouth are to be washed with vinegar. In Wright's *Practical Poultry-Keeper* it is specially recommended that the diseased birds should be kept warm; they are to be fed on oatmeal mixed with ale, and to have plenty of green food.

PIPA, *pī'pâ:* genus of batrachians, in general form resembling frogs and toads, and characterized by the very broad and triangular head, whose sides are destitute of the glands (*parotoids*) so large in the true toads; the eyes small, and near the margin of the lower jaw; the ear concealed beneath the skin; the tongue merely rudimentary; the jaws destitute of teeth; the fore-feet not webbed, but divided into four fingers, each of which divides at the extremity into four small points, these, again, being minutely divided in a similar manner; the hind-feet five-toed and completely webbed; the larynx of the male extremely large—a triangular bony box, within which are two small movable bones for occasionally closing the entrance of the bronchi; the back of the female furnished with numerous cells or pouches, in which the eggs are hatched, and the young undergo all their transformations till they have attained a form similar to that of their parents. These characters are so remarkable as to make the creatures of this genus objects of peculiar interest; but particularly as to their mode of rearing the young. It was at first supposed that the young were produced in some unusual way in the cells from which they were seen finally to emerge; but this is not the fact. The eggs are deposited by the female in the ordinary manner, and are carefully placed by the male in the cells of her back, which close over them. When the young are ready to use their limbs, they struggle out of the cells, to which they never return. The best-known species of P. is that commonly called the Surinam Toad (*P. Surinamensis*), native of Guiana and other warm parts of continental America, where it inhabits swamps and ditches, and is found occasionally in damp and dirty corners of houses. It is sometimes seven inches long; its color is brownish-olive above, whitish below; the skin covered with small hard granules, mingled with occasional horny tubercles. The whole aspect of the creature is hideous.

PIPE, n. *pīp* [Dut. *pijp;* Dan. *pibe;* Ger. *pfeife*, a pipe: also Gael. *piob;* Ir. *pib;* W. *pib*, a pipe, a tube]: thin hollow cylinder; a tube; a long tube or cylinder for conveying water, gas, steam, etc. (see PIPES or TUBES): a wind musical instrument consisting of a pipe or tube of wood or metal; the key or pitch of the voice; tube of clay or wood, etc., of the diameter of a goose-quill, with a turned-up open head, for smoking tobacco (see TOBACCO-PIPES): the roll of creditors in the British exchequer: V. to play on a pipe; to send forth a shrill sound; to call by means of a pipe or whistle, as in a ship. **PI′PING**, imp.: ADJ. weak; feeble, as ‘the *piping* time of peace’; sickly—from the weak voice of the sick; playing on the pipe; boiling hot, as water: N. the act of one who pipes; a kind of cord trimming or fluting for ladies’ dresses. **PIPED**, pp. *pīpd*. **PIPAGE**, *pī′pāj*, distribution or conveyance by means of pipes, as of petroleum, gas, water, etc. **PI′PER**, n. *-pér*, one who plays on a pipe; a native species of gurnard which utters a noise when taken out of the water. **PIPES**, n. plu. *pīps*, a musical instrument consisting of a collection of pipes or tubes. **PIPE-CLAY**, grayish-white clay (see below). **PIPE-COUPLING**, joint by which 2 pipes are connected, or by which a pipe is connected with another object **PIPE-FISH**, fish having a long slender body of the thickness of a swan’s quill (see below). **PIPE-LAYING**, act of laying pipes for the conveyance of water, gas, etc : in a figurative sense, laying plans for carrying out of a scheme or purpose; used particularly of the scheming of political managers. **PIPE-LINE**, pipe conduit under ground for conveyance of fluids; specifically of iron pipe for conveyance of petroleum from the oil wells to a distant market or a refinery. The Penn. oil regions are connected by pipe-lines with both New York and Chicago. **TO PAY THE PIPER**, to pay the expense, as at an entertainment, where the presence of a paid piper used to be deemed indispensable.

PIPE, n. *pīp* [F. *pipe*, a barrel of wine; in OF. a tube, a nozzle: Dut. *pijp*, a pipe, a tube]: measure of quantity common in Portugal, Spain, France, and in some other countries which trade with these: used almost exclusively for wine and oil, and with a particular value for almost each locality. The pipe is called in England a butt, and is equal to two hogsheads, or half a tun. The pipe of Oporto is larger than those of Lisbon and of Spain in the proportion of 93 to 76. There are three different measures of this name in France; and there was formerly a pipe, a measure of capacity for dry substances, in use by the Bretons. But the pipe in England varies with the kind of wine that it contains: a pipe of port contains 114 imperial gallons; of sherry, 108 imperial gallons; and of madeira, 92 imperial gallons; while the common English pipe contains 126 wine gallons, or 105 imperial gallons nearly.

PIPE′CLAY: a fine Clay (q.v.), free from iron and other impurities, having a grayish-white color, a greasy feel, and an earthy fracture. It adheres strongly to the tongue, and is very plastic, tenacious, and infusible. It is used for manufacture of tobacco-pipes and white pottery, and by soldiers for cleaning their white trousers, and especially their belts.

PIPE′-FISH (*Syngnathus*): genus of osseous fishes of order *Lophobranchii* (q.v.), and family *Syngnathidæ.* In this family the form is elongated, there is little flesh, and the body is almost covered with partially ossified plates; the head is long; the jaws are elongated to form a tubular snout—whence the names P. and *Syngnathus* [Gr. *syn*, together; and *gnathos*, a jaw]; and the males have pouches, variously situated, in which they receive the eggs of their mate, and carry them till they are hatched. The family *Syngnathidæ* is sometimes restricted to those in which the egg-pouch of the males is on the tail, and is open throughout its whole length, and the tail is not prehensile. Thus restricted, it contains a number of genera. Three or four species occur on the Atlantic coast of N. Amer.—The Great P. (*Syngnathus acus*) is found sometimes in deep water, and sometimes at low tide among sea-weed in rock-pools. The specimens commonly seen are 12 to 16 inches in length; but this fish is said to attain a length of 2 or 3 ft. Its food, and that of the other species, is believed to consist of small marine animals and eggs of fishes; and it may be seen slowly moving about, with curious contortions, poking its long snout into every crevice in search of food, and sometimes assuming a vertical position with the head downward, poking into or stirring the sand. This and the other pipe-fishes show great affection for their young, which are believed to return, on the appearance of danger, to the pouch of their male parent, after they have begun to leave it and to swim about in the sea.

Pipe-fish (*Syngnathus acus*).

The name P. is sometimes given also to the fishes forming the family *Fistularidæ* (q.v.), or Flute-mouths, called sometimes *Pipe-mouths.*

PIPERACEÆ, *pī-pėr-ā'sē-ē:* natural order of exogenous plants, natives almost exclusively of the hottest parts of the globe, particularly of Asia and America. None are found in cold regions. About 600 species are known, to most of which the name PEPPER is sometimes given; though some are known by other names also, particularly those of which the fruit is not used as a spice, but of which some part is employed for some other purpose, e.g., Betel, Cubebs, Matico, and Ava. (See these titles.) But Pepper (q.v.) is the most important product of the order. Of the P., a few are almost trees; but they are generally shrubs or herbaceous plants, often climbing. They have jointed stems; opposite whorled or alternate leaves, with or without stipules, and insignificant greenish flowers in slender spikes, unisexual or hermaphrodite, the different kinds generally mingled in the same spike; the flowers without calyx or corolla, but each with a bract, the stamens 2–6, the ovary with one cell and one ovule, and crowned with one or three stigmas; the fruit somewhat succulent, containing one seed.

PIPER BETLE, n. *pī'pėr be'tl* [L. *piper*, pepper: Sp. *betle*, betel]: the betel-pepper, a plant whose leaf is used with areca-nut for chewing by Malays, etc.: see under BETEL.

PIPERINE, n. *pĭp'ėr-ĭn* [L. *pĭper*, pepper: F. *pipérin*], ($C_{17}H_{19}NO_3$): alkaloid possessing very weak basic properties, which is found in the Pepper tribe. It may be obtained by heating powdered pepper with alcohol, which extracts the P. and some resinous matter, which may be removed by digestion in a solution of potash. It crystallizes in colorless tetragonal plates, tasteless and odorless; is insoluble in cold water, but dissolves readily in alcohol and ether: the alcoholic solution has a sharp, peppery taste: the crystals melt at 100° C. (212° F.) to a pale-yellow, limpid oil. On heating P. with soda-lime, a remarkable oily base, *Piperidine* ($C_5H_{11}N$), is obtained, with pungent odor, resembling that of both ammonia and pepper. It boils at 106° C. (222·8° F.), is soluble in alcohol and ether, and has a strong alkaline reaction.

PIPES, or **Tubes**: long hollow cylinders of various materials and for various purposes; e.g., draining-pipes for agricultural and sanitary purposes, made of earthenware, wood, and metal; pipes of various metals for a great variety of purposes; and Tobacco-pipes (q.v.) of various materials. Wooden pipes, formerly used for conveying water and for draining, have given place to pipes of metal and earthenware. For agricultural purposes *drain-tiles* are of ordinary brick-clay; and are produced very rapidly and cheaply by machinery. They are of various sizes: a common size is 15 inches in length by 2½ inches diameter. The operation of the drain-tile machine is to squeeze a continuous length of soft plastic clay through a ring-shape orifice, the centre of which is occupied by a core or mandrel of the size of the hollow part of the pipe. Another arrangement of the machine is to cut the pipe to the proper lengths as it passes through, and by means of a travelling-table, to carry these forward to be removed to the sheds, where they are dried, previous to being burned in the kilns.

Earthenware pipes are now made of almost every size, from an inch or two in diameter to the great size of 54 inches. They are usually of fire-clay, and glazed like common pottery: see Pottery. They are wider at one end, so as to form a socket, as in fig. 1, to receive the end of another, and thus form a continuous tube. These are greatly used for the drainage of houses, and for sewering, for which they are admirably adapted: the inner surface being glazed as well as the outer, offers no resistance to sedimentary matters, which are consequently carried away readily. These pipes are of great strength. Instead of the ordinary socket-jointed circular pipes, Norman Shaw, one of the leading architects of London, uses a culvert of an egg-shaped section, open all along the top, with a rebated flange to receive flat covers. About the laying of these covers there is no difficulty, and when laid they can be inspected from end to end, each joint examined, and the uniformity of the fall tested accurately. Should an imperfectly laid culvert be detected, it is easily taken out and another put in its place. When the culverts are found to be all well laid, and when the whole has been examined, the loose covers are laid in and pointed with cement, and then the whole covered over with portland cement. If at any time the drain has to be examined, it is at least as easy to cut through the cement bed and chip out a covering tile as to cut a hole in a drain-pipe. But in fact, as the culverts can be laid correctly, there will very rarely be any occasion for cutting into them. They can be made of glazed earthenware or of Portland cement. Another kind, for chimney flues, are also made of fire-clay, but unglazed externally, and so thick, that there is little fear of breaking. They are placed one on another and are built into the walls of houses,

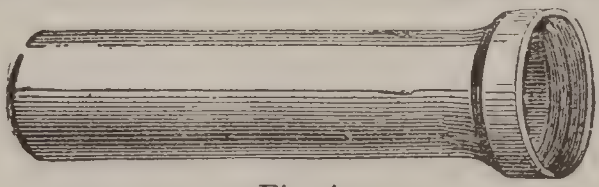


Fig. 1.

Fig. 2.

instead of the ordinary chimneys, and in this way save much labor in building, and afford a much more effective, and easily cleaned flue (fig. 2). *Caoutchouc vulcanized* and *gutta percha* are also extensively used for making pipes for a variety of purposes, their flexibility rendering them very useful. *Leathern pipes* are chiefly for temporary conveyance of water, as in the case of fire-engines: they are generally called *hose.* Metal pipes are of iron, lead, tin, or an alloy of tin and lead, copper, brass, etc. Iron pipes are used for water and gas distribution, and their manufacture has become of enormous extent, for supply of the vast water and gas systems in cities and towns.

Pipes made from brass, copper, and tin are made by first casting an ingot of the metal into the shape shown in fig. 3, with a hole through its length of the same diameter as the intended bore of the pipe. Into this is placed an iron rod, called the mandrel (*a*, fig. 4), which exactly fits, and which projects slightly at the tapered end (*b*, fig. 4). It is then brought to the drawing-table, and here the small end with its projecting mandrel is put into a funnel-shaped hole, drilled through a steel post (*a*, fig. 5), so as to allow the point to be griped on the other side by a pair of pincers, at the end of a strong chain; the machine-power is then applied to the other end of the chain, and the soft metal and its mandrel are drawn through, the former being extended equally over the surface of the latter, which is then removed, and the length of pipe is complete. Some metals require repeated drawing through holes, gradually diminishing in size, and have to be softened or annealed at intervals, as the metal hardens under repeated drawing. In this way, brass, copper, tin, steel, and pewter pipes are made. Lead pipes are made of great lengths by squeezing the soft hot metal through a hole in a steel plate in which is a fixed core or mandrel projecting, which forms and regulates the size of the bore of the pipe. Pipes are also made from copper, brass, and sheet iron by rolling out narrow strips of metal, and then passing them successively through rollers, which are deeply grooved, and which turn up the edges (fig. 6). A mandrel is then laid in it, as in fig. 7, and it is next passed through double-grooved rollers, which turn the

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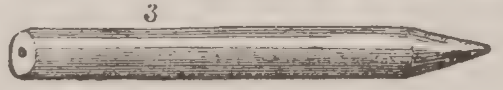

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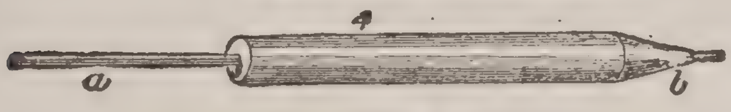

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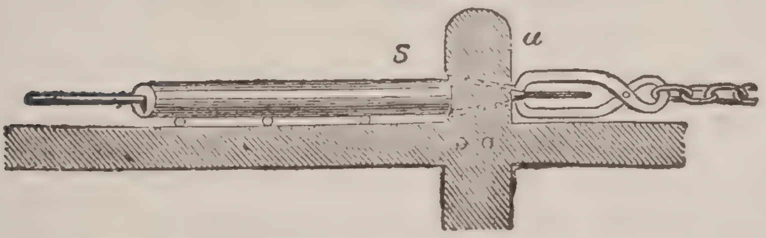
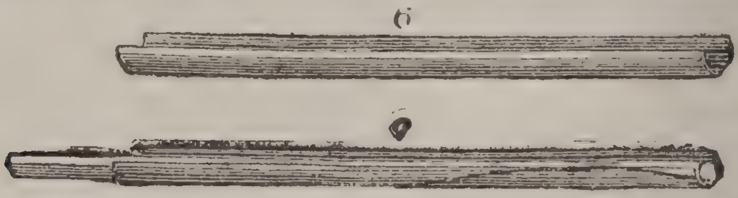


edges in, and thus form a complete tube round the mandrel. The edges require soldering, or if of iron, welding. Welded iron tubes of this description are used to an immense extent for gas and steam distribution, and for construction of locomotive and tubular boilers. The weld may be a 'butt-weld,' or for greater strength a 'lap-weld.' All boiler tubes used to be made in this way; but the method of drawing has lately been so much improved, that copper and brass pipes, or tubes, as they are frequently called, are now drawn of considerable thickness and diameter.



Two recent developments are the spiral sheet metal pipes and the seamless Mannesmann pipes. The first are made from strips of sheet metal wound spirally in a machine and riveted or welded at the seam as fast as wound. These are very extensively used in this country. These tubes, invented by the brothers Mannesmann, of Germany, are made by rolling a mass of steel at welding heat between peculiarly corrugated tapered rollers whose axes are inclined to each other. In this way the metal is so drawn that it is forced into a tubular shape without the necessity of any mandrel. It is one of the most remarkable of recent metallurgical inventions. It is possible to roll the metal so as to form a long tube closed hermetically at both ends. A mandrel is generally used, but is not indispensable, as it acts but a secondary part, the tube-forming action coming from the rolls.—Seamless steel tubes have acquired some importance in their application to the construction of bicycles.

PIPE'-STICKS: wooden tubes used for some tobacco-pipes. Among the most prized are the Agriot or Cherry pipe sticks of Austria; the young stems of the Mahaleb Cherry (*Prunus Mahaleb*) which is extensively grown for the purpose in the environs of Vienna. Excessive care is bestowed on the cultivation of these shrubs, which all are raised from seed. When the seedlings are two years old, they are each planted in a small pot, and as they grow every attempt at branching is stopped by removing the bud. As they increase in size from year to year, they are shifted to larger pots or boxes, and great care is taken to turn them round almost daily, so that every part is equally exposed to the sun. When they have attained sufficient height, they are allowed to form a small bushy head, and continue to receive the same attention in daily turning, etc., until they are thick enough in the stem. They are then taken up, and the roots and branches removed, and the stem put by to season. Afterward they are bored through, and are ready for use. These pipe-sticks have an agreeable odor, and are covered with a reddish-brown bark, which is retained. Sometimes they are five ft. in length, and as smooth and straight as if turned. When of such a length, they command high prices. In Hungary, pipe-sticks made from the stems of the

Mock Orange (*Philadelphus coronarius*) are much used; and the jessamine sticks of Turkey are in great esteem in all countries. Orange and lemon trees and ebony also are used. The chief recommendation of these materials seems to be in the power of the wood to absorb the oil produced in smoking tobacco, and consequently to render the smoke less acrid: see TOBACCO-PIPES.

PIPETTE, n. *pĭ-pĕt′* [dim. of *pipe*]: in *chem.*, a small glass tube having a bulb in the middle.

PIPI, *pī′pĭ:* name given to the ripe pods of *Cæsalpinia Papai* (see CÆSALPINIA), used in tanning, and frequently imported with Dividivi (q.v.), and sometimes separately, though they are very inferior to dividivi. Pipi, being straight, are easily distinguished from the pods of dividivi, which are curved.

PIP′ING CROW: see BARITAH.

PIPISTREL, n. *pĭ-pĭs′trĕl* [It. *pipistrello;* L. *vespertilio* a bat—from *vesper*, the evening]: a species of bat, the smallest of the kind.

PIPIT, *pĭp′ĭt*, or TIT′LING, or TIT′LARK (*Anthus*): genus of birds included by Linnæus among Larks (family *Alaudidæ*), but now regarded as belonging to the sub-family *Anthinæ*, of the family *Motacillidæ* (Wagtails and Pipits); sub-order *Oscines*. The bill is more slender than in larks; the tips of the mandibles slightly bent downward and notched. The hind-claw is long, though not so long as in larks, and more or less curved. The plumage resembles that of larks; in habits and motion of the tail, there is greater resemblance to wagtails. The bill is not strong enough for feeding on grain or hard seeds, and insects and worms are the principal food of pipits. One species is the MEADOW P., COMMON TITLARK, or TITLING (*A. pratensis*), familiarly known in many parts of England and Scotland as the *Moss-cheeper* and occurring in Greenland, and, it is said, in Alaska. It is found in almost all parts of Europe, and in n. Asia, in w. India, in Japan, and in Iceland. It is a small bird, its color brown of various shades tinged with green; bill and feet mostly flesh-color. It frequent heaths, mosses, and pastures; and usually makes its nest on a grassy bank, or beside a tuft of grass or heath. Its song is weak and plaintive, and it generally sings in the air. It is gregarious in winter. The cuckoo is said to deposit its egg frequently in the nest of the Meadow P.—The common AMERICAN TITLARK (WAGTAIL, BROWN LARK, LOUISIANA PIPIT) is *A. ludovicianus;* bill blackish, feet brown; under-parts buffy, not greenish; found in all parts of N. America and in the Rocky Mts. above timber-line.—A rather larger species is the TREE P., or FIELD TITLING, which has a shorter claw, and perches on trees, frequenting inclosed and wooded districts; a summer visitant of Britain, and found in most parts of Europe, in Asia, and n. Africa.—The Rock P., or SEA TITLING (*A. petrosus*), a shore-bird, is rather larger than the Tree P., and has a long curved hind-claw: it feeds chiefly on small marine animals, seeking its food close to the edge of the retiring tide.

PIPKIN, n. *pĭp'kĭn* [a dim. of PIPE 1]: a cruet; a little pot; an earthen pot glazed on the inside, used in boiling.

PIPPI, GIULIO: see GIULIO ROMANO.

PIPPIN, n. *pĭp'ĭn* [Dan. *pipling*, a small well-tasted apple: comp. F. *pepin*, so called probably because raised from the *pip* (q.v.) or seed]: name given to many varieties of apple, among which are some of the finest in cultivation, as the *Golden P.*, *Ribston P.*, etc.

PIQUA, *pĭk'wa:* city, Miami co., O.; on the Chicago St. Louis and Pittsburgh, and the Cincinnati Hamilton and Dayton railroads; on the Miami river, and the Miami and Erie canal; 28 m. n. by w. from Dayton, 73 m. w. by n. from Columbus. There are 13 churches; several schools; three daily and four weekly newspapers, one of the latter in German; two national banks, combined cap. $350,000, an opera-house, and some excellent hotels. Large iron-works have been established here, oil refineries are in active operation, and there are manufactures of furniture, mattresses, and various other articles. Water is furnished by the Holly system. The city is a distributing point for products of the surrounding agricultural region. The streets are wide and are lighted with gas and electricity. The river, which furnishes an excellent water power, is crossed by three bridges. Pop. (1880) 6,031; (1890) 9,090; (1900) 12,172.

PIQUANT, a. *pē'kănt* [F. *piquant*, pricking, tart—from *piquer*, to prick]: pungent; sharp; tart; stimulating to the tongue; severe, as applied to language. PI'QUANTLY, ad. *-lĭ.* PIQUANCY, n. *pē'kăn-sĭ*, pungency; sharpness; severity.

PIQUE, n. *pēk* [F. *pique*, animosity—from *piquer*, to prick]: slight anger or resentment; wounded pride; offense taken; grudge; point; punctilio; term at a game of piquet: V. to displease, offend, or irritate; to touch with envy or jealousy; to pride or value one's self, as on an accomplishment or acquirement. PIQUING, imp. *pēk'ĭng.* PIQUED, pp. *pēkt.*—SYN. of 'pique, n.': offense; ill-will; displeasure; irritation; vexation; in *OE.*, nicety;—of 'pique, v.': to provoke; stimulate; sting; goad; nettle; fret; excite.

PIQUÉ, n. *pē-kā'* [F.]: a French material, strong and durable, woven with two cotton threads, one thicker than the other, usually having a lozenge-shaped pattern.

PIQUET, n. *pĭk'ĕt:* another spelling of PICKET, which see.

PIQUET, n. *pē-kĕt'* [F.: said to be from F. *pique*, as if a small contest or scuffle]: game of cards played between two persons with 32 cards—viz., the four honors, and the highest four plain cards of each suit. The cards are shuffled and cut as in whist, and then dealt, two by two, till each player has 12; and the remaining 8, called the *talon*, or stock, are then laid on the table. The first player must then discard from one to five of his cards, replacing them with a similar number from the talon; and after him, the younger hand may discard if he pleases, similarly making up his proper number from the remaining cards of the talon. The player who first scores 100 wins the game, and the score is made up by reckoning in the following order—carte-blanche, the point, the sequence, the quatorze, the cards, and the capot. *Carte-blanche* is a hand of 12 plain cards, and counts 10 for the player who possesses it. The *point* is the greatest number of cards in any suit, or, if the players are equal in this respect, that which is highest in value (the ace counting 11, each court card 10, and the plain cards according to the number of pips), and counts a number equal to the number of cards in the suit. The *sequence* is a regular succession of three or more cards in one suit, and the highest sequence (i.e., the one containing the greatest number of cards, or if the players have sequences equal in this respect, the one of the two which begins with the highest card), if of three cards, counts 3; of four cards, 4; of five cards, 15; of six cards, 16, etc. The *quatorze* is a set of four equal cards (not lower than tens), as four aces, four queens, etc., and the highest quatorze counts 14 for its holder; but should neither player have a quatorze, then the highest set of three is counted instead, but it reckons only three. The possessor of the highest sequence or the highest quatorze also counts all inferior sequences and quatorzes (including sets of three); while his opponent's sequences and quatorzes go for nothing. The first player reckons his points, and plays a card; the dealer then reckons his points, and follows his opponent's lead, and cards are laid and tricks are taken as in any ordinary card-game. Each player counts one for every card he leads, and the taker of the trick (if second player) counts one for it; the possessor of the greater number of tricks counting 10 in addition (the 'cards'), or if he takes all the tricks, he counts 40 in addition (the 'capot'). If one player counts 30—i.e., 29 by his various points, and one for the card that he leads, before his adversary has counted anything, he at once doubles his score, reckoning 60 instead of 30 (this is called the 'pique'); and should his scorce reach 30 before he plays a card, or his adversary begins to count, he mounts at once to 90 (the 're-pique').

PIQUÉ WORK, *pē-kā' wėrk:* very fine kind of inlaying with gold, silver, and other costly materials; it is, in fact, a kind of Buhl-work (q.v.), done on a very minute scale. It is applied only to articles of small size, such as snuff-boxes, card-cases, and similar articles.

PI'RACY: robbery on the high seas; an offense against the law of nations. It is a crime not against any particular state, but against all mankind, and may be punished in the competent tribunal of any country where the offender may be found, or into which he may be carried, though committed on board a foreign vessel on the high seas. It is of the essence of piracy that the pirate has no commission from a sovereign state, or from one belligerent state at war with another. Pirates being the common enemies of all mankind, and all nations having an equal interest in their apprehension and punishment, they may be lawfully captured on the high seas by the armed vessels of any particular state, and brought within its territorial jurisdiction for trial in its tribunals. The African slave-trade was not considered piracy by the law of nations; but the municipal laws of the British Kingdom and of the United States by statute declared it to be so; and since the treaty of 1841 with Great Britain, it is so declared also by Austria, Prussia, and Russia.

PIRÆUS, *pī-rē′ŭs* (Gr. *Peiraíeus*): principal harbor of both ancient and modern Athens (q.v.). Only a few traces remain of the long walls which formerly united it and Munychia with the capital city. The modern P., which has sprung up since 1835, is a regularly laid-out town, with some good houses and shops, and a handsome stone exchange, built at the expense of the municipality. It was in 1869 connected with Athens by a railway, and it has several spinning factories of recent construction. The harbor, called also Porto Leone or Drakoni, is both safe and deep; but the entrance is narrow. In 1871 the number of vessels which entered the P. was 6,206, with tonnage 294,388. Pop. (1890) 36,000; (1896) 42,169.

PIRANO, *pē-râ′nō:* seaport of Austria, in the markgrafdom of Istria, on a peninsula in the bay of Largone, 15 m. s.w. of Trieste. It contains an old castle, has a port and several dockyards, commodious roads, in which large vessels find safe anchorage, and is the seat of considerable trade and commerce. Among its more important edifices are an interesting Gothic church, a town-house, and a Minorite convent, with a number of good pictures. Wine and oil are made in considerable quantities, and there are salt works in the neighborhood which produce more than 330,000 cwts of salt annually. Pop. (1890) 7,224.

PIRATE, n. *pī′rāt* [F. *pirate;* It. *pirato*—from L. *pirāta;* Gr. *peiratēs*, a sea-robber—from Gr. *peirāō*, I make an attempt]: one who lives by robbing ships at sea; an armed ship employed by pirates; figuratively, one who republishes the literary or artistic productions of another without leave: V. to take without right or permission, as the contents of books for republication; to counterfeit; to rob ships on the sea. Pi′rating, imp.: Adj. republishing literary or artistic works without permission; counterfeiting Pi′rated, pp.: Adj. taken by theft or without permission. Piracy, n. *pī′ră-sĭ*, act or crime of a pirate; robbery of ships by open violence on the high seas (see below): the republishing the writings of other men without permission. Piratical, a. *pī-răt′ĭ-kăl*, or Pirat′ic, a. *-ĭk*, robbing or plundering on the high seas by open violence; applied to literary theft. Pirat′ically, ad. *-lĭ.*

PIRAYA, *pĭ-râ′ya*, or Pirai, *pĭ-rī′:* name in Guiana for *Serrasalmo piraya*, and other species of *Serrasalmo*, a genus of fishes of family *Characinidæ*, regarded by many as a section of *Salmonidæ* (q.v.). The fishes of this genus, of which numerous species inhabit the rivers and fresh waters of tropical S. America, have a compressed and deep body, the belly keeled and serrated with a double row of hard serratures. They are extremely voracious, and not only consume with great rapidity dead carcasses thrown into the water, but attack living creatures much larger than themselves, biting off the fins of large fishes, and then devouring them at leisure, often mutilating ducks and geese by depriving them of their feet, and venturing to attack even oxen and human beings. The latter, however, make reprisals on them, and find them very good food. *Serrasalmo piraya* seldom exceeds 10 or 12 inches in length, but some of the species attain considerably larger size. Some are brilliantly colored. The Indians use the teeth for sharpening the arrows, made of the very hard ribs of palm-leaves, which they use for their blowpipes, and which they sharpen to a very fine point by drawing them across a piraya's jaw, an article with which the Indian of Guiana is always provided; nor does the edge of the teeth soon begin to be worn. Pirayas are taken readily by a hook baited with almost any kind of bait; but they at once cut through any line, and the line must therefore be cased above the hook in tin-plate. The Indians often shoot them with arrows.

PIRMASENS, *pēr'mȧ-sĕnts:* town of the Bavarian Palatinate, formerly chief town of the county of Hanau-Lichtenberg, 22 m. w. of Landau. Its chief manufactures are shoes and musical instruments. Pop. (1900) 30,195.

PIRN, n. *pėrn:* in *Scot.*, a quill or reed; a bobbin; a reel on which thread or yarn is wound; the reel of a fishing-rod.

PIRNA, *pēr'nâ:* small town of Saxony, on the left bank of the Elbe, 11 m. by railway s.e. of Dresden. It is surmounted by a hill, crowned by a castle, now used as a lunatic asylum, contains a beautiful parish church, and a number of important benevolent institutions. Manufacture of stoneware employs many hands. Pop. (1895) 15,672.

PIROGUE, n. *pī-rōg'* [F. *pirogue*—from Sp. *pirag'ua*—originally a W. Indian word]: a kind of canoe consisting of the hollowed trunk of a single tree, used in the southern and eastern seas, in *N. Amer.*, a narrow ferry-boat.

PIROROCCO, n. *pĭr'ŏr-ŏk'kō* [Brazilian]: the term applied to the tidal bore of the Amazon.

PIROUETTE, n. *pĭr'û-ĕt'* [the origin of *pirouette*, according to Littré, is unknown; Skeat's derivation from the Guernsey word *piroue*, a little wheel or whirligig, is very probable, *pirouette* being merely its diminutive: the word is of imitative origin]: in *dancing*, a whirling or turning about on the toes; the circumvolution of a horse on the same ground: V. to whirl round, while dancing, on the toes of one foot. PIR'OUET'TING, imp. PIR'OUET'TED, pp.

PISA, *pē'zâ* or *pē'sâ:* one of the oldest and most beautiful cities of Italy, cap. of the province of P., which was part of the late grand duchy of Tuscany. P. is on the banks of the river Arno, which intersects the city and is spanned by three noble bridges; 43° 43′ n. lat., and 11° 24′ e. long. It has broad, straight, well paved streets, and several fine squares. Among its 80 churches, the most notable is the cathedral, or Duomo, begun 1068, completed 1118, with its noble dome, supported by 74 pillars, and its fine paintings, variegated marbles, and painted windows. Near the cathedral stands the round marble belfry known as the Leaning Tower of Pisa, deviating about 14 ft. from the perpendicular. This celebrated building, 180 ft. in height, with seven stories divided by rows of columns, and surmounted by a flat roof and an open gallery commanding a splendid view of the surrounding country, was erected in the 12th c. by the German architect, Wilhelm of Innsbruck. The Baptistery, or Church of St. John, opposite the cathedral, an almost equally remarkable structure, was completed 1162 by Diotisalvi. The main building, circular, and raised on several steps, supports a leaden-roofed dome, having a second dome above it, surmounted by a statue of St. John: the beautifully proportioned interior, noted for its wonderful echo, contains a pulpit which ranks as the greatest masterpiece of Nicola Pisano, various pieces of sculpture, and a large octagonal marble font. The Campo-Santo, or ancient national cemetery, dates from 1228, when the Pisans caused earth to be brought from Jerusalem for the graves of the most distinguished citizens of the republic. In 1283 the ground was surrounded by cloisters, the walls of which were adorned by fresco-paintings, now nearly obliterated, though some of these works of art, which are chiefly by Giotto, Veneziano, Orcagni, and Memmi, still retain traces of their original beauty. Among the other public buildings of P., special notice is due to the churches of La Madonna della Spina and San Stefano, both rich in paintings and sculptures, and the latter famous for its organ, the largest in Italy; the grand ducal and Lanfranchi palaces; the Torre della Fame, so called from its being supposed to have been the spot in which Ugolino Gherardesca and his children were starved to death 1288; the university, founded 1330, and restored by Cosmo I. de' Medici, which had high reputation in the middle ages, and still is noticeable for its library, botanical garden, observatory, and affiliated schools and art collections, etc. In the neighborhood of P., at the foot of San Giuliano, are the mineral baths, whose fame, known to Pliny, continued through the middle ages to attract sufferers from every part of Italy. The waters, rich in carbonic acid and chloride of sodium, are efficacious in various arthritic and rheumatic affections.—Pop. of P., in the 13th c. 150,000, had fallen in the 19th c. to less than 25,000; but of late years trade and industrial arts have made rapid advance, and the pop. has increased. It now counts about 35,000 within the walls, and including the suburbs about 62,000.

History.—Ancient P., like other Etruscan cities subject to Rome, retained its municipal govt. and had almost unlimited freedom while nominally under Roman protection; but on the decline of the imperial power it was compelled to submit in turn to the various transalpine nations who successively overran n. Italy. Early in the 11th c. P. had risen to the rank of a powerful republic, whose sway included the then fertile district known as the Maremma di Lerici, and which yielded little more than nominal homage to its suzerain lords, the emperors of Germany. Throughout the 11th c. P. was at the height of its prosperity, and to this period belong most of the splendid monuments of art that still adorn it. Its troops took part in all the great events of the Holy Land; and its fleet in turn gave aid to the pope in s. Italy, to the emperor in n. France, chastised the Moors, and exacted its own terms from the Eastern emperors. In their wars with the Saracens of Sardinia, the Pisans had conquered Sardinia, Corsica, and the Balearic Islands, and for a time maintained their ground against their hereditary enemies, the Genoese; but having sided with the Ghibellines in the long wars which desolated the empire, P. suffered severely at the hands of the victorious Guelphic party. Indeed, the rivalry of the Guelphic cities of Florence, Lucca, and Siena, brought P. to the brink of ruin at the close of the 13th c.; and after struggling more than a hundred years against external foes and the internal dissensions between the democratic mob and the Ghibelline nobles, without losing their character for indomitable valor, the Pisans finally threw themselves under the protection of Galeazzo Visconti of Milan. The son of the latter sold the Pisan territory to their greatest enemies, the Florentines, from whose tyrannical rule it was for a time relieved by Charles VIII. of France, who, 1494, accepted the protectorate of the city. When the French left Italy, the old struggle was renewed; and after a desperate resistance, the Pisans, 1509, were compelled by hunger to surrender to the Florentine army. The most influential families, as formerly in 1406, emigrated. P., with the rest of Tuscany, became part of the kingdom of Italy 1860. Since 1868 P. has given its name to an Italian province—pop. (1881) 283,269; (1890) 300,470; pop. of city (1892) 61,500; (1901) 61,321.

PI'SA, Council of: in 1409, one of the councils commonly reputed by Rom. Catholics as ecumenical or general, though some, especially of the Ultramontane (q.v.) school, do not rank it as such. It was assembled in the time of the great Western Schism, for restoring the peace of the church and the unity which had been interrupted by the rival claims of two competitors for the papacy. For the history of this rival claim, see Schism, Western. For our present purpose, it is enough to state that the adherents of both the claimants of the see of Rome—those of Gregory XII., as well as those of Benedict—agreed on the necessity of a general council as the only means of putting an end to the schism; and the rival popes having themselves either evaded or declined the demand, the cardinals of both united in issuing letters of convocation, and in summoning both the claimants to the council so convened. Neither of them complied with the citation; but the council proceeded, nevertheless, to examine and deliberate on the case. It was opened at Pisa, 1409, Mar. 25; there being present 22 cardinals, 4 patriarchs, 12 archbishops, 80 bishops, together with representatives of 12 archbishops and 102 bishops, and a vast body of abbots, doctors in theology, and other eminent ecclesiastics. After formal citation of the rival popes to appear within a stated period, the council on the expiration of that period proceeded to declare them contumacious, and to examine their respective claims as though they had appeared. The result, after protracted inquiry, was a decree in the 13th session by which they both were declared schismatics, and their conduct heretical, and calculated to lead the people from the faith; wherefore, since they had violated the solemn engagements made at their respective elections, they were deposed from the papal dignity, and their followers released from obedience. In the 17th session, the cardinals having first pledged themselves by oath, each, that, if elected, he would continue the sittings of the council, entered into conclave to the number of 24, and unanimously elected Peter Philargi, one of the cardinal priests, and a member of the Franciscan order. He took the name Alexander V. The council proceeded after his election to pass a number of decrees, to give validity to the acts on either side during the schism. A vain attempt was made to obtain the submission of the still recusant rivals, and it was resolved that a new council should be held within three years. The authority of this council, like that of the Council of Constance, is alleged, on the Gallican side, as establishing the superiority of a general council over the pope. But the Ultramontanes reply that both these councils, also that of Basel, must be regarded as abnormal assemblies, called to meet the special emergency of a disputed succession and of a doubtful pope, and that these principles cannot by any means be applied to the ordinary circumstances of the church, or form a precedent by which to estimate the normal relations between a pope whose title is certain and undisputed, and a general council regularly assembled at a time of peace, and in the ordinary circumstances of the church. It cannot be doubted, nevertheless, that the spirit of the fathers at Pisa was the same which pervaded the succeeding assemblies at Constance and Basel, and found its permanent representation in the Gallicanism (see GALLICAN CHURCH) of later centuries.

PISANO, *pe-zâ'no*, ANDREA (ANDREA DA PONTADERA): sculptor: about 1270-1348. He began to study with Giovanni about 1300; and become the ablest of his pupils. He was called to Florence to execute in marble the statues, bas-reliefs, etc., designed by Giotto in ornamenting the cathredral of S. Maria del Fiore, then in course of erection. P.'s later style is attributed to Giotto rather than to his first master. He soon gained high position and important employment. He executed numerous statues for the façade of the cathedral, and a bronze gate for the baptistery, of great excellence. This gate remains, together with the later and more celebrated gates of Ghiberti. Under the influence of Giotto's genius, he became Giottesque in thought and style; and his works bear so distinctly the impress of that master-mind, that the design of many of them and particularly the baptistery gate, are ascribed to Giotto, See Vasari; *Christian Art,* by Lord Lindsay; Agincourt, *Davia Memorie Istoriche;* Rosini. *Storia, etc.;* Cicognara (tom. I.), *Monumenti Sepolcrali della Toscana.*

PISA'NO, NICCOLA: distinguished sculptor of Pisa. to the influence of whose works mainly the rise or restoration of sculpture in connection with Gothic architecture is attributable: about 1206–1278. There is no record of the date of his birth, but from an inscription on a celebrated fountain in Perugia, designed by him and executed by his son Giovanni. it is evident that he was born at the beginning of the 13th c. The place of his birth is variously stated as Siena (quite doubtful), and Apulia in s. Italy, or an Apulia (Tuscan) near Lucca. His earliest work is supposed to be the *Deposition* over one of the doors of the façade of the cathedral at Lucca, 1233. He worked on the principle of studying nature, modified or corrected by the ideal of antique sculpture; and it is said that he adopted this principle from the sculpture on an ancient sarcophagus brought from Greece in the ships of Pisa; but though most of the finest specimens of Greek sculpture were not discovered till long after P.'s time, he must have had opportunity of studying many important remains on the various classic ruins with which Italy abounds. This sculptor's reputation is supported by three important works, still admired—the pulpit of the baptistery at Pisa, the 'Arca' or shrine of St. Dominic for the church of that saint at Bologna. and the pulpit of the cathedral at Siena. The first, finished 1260, is reckoned the most elegant pulpit in Italy: it is of white marble. six-sided, supported by seven Corinthian columns. and adorned with five bas-reliefs of subjects from the New Test. The second work, the 'Arca' of St. Dominic, is of greater extent: it is composed of six large bas-reliefs, delineating the six principal events in the legend of St Dominic, and is ornamented with statues of our Savior, the Virgin, and the four doctors of the church. The operculum or lid was added about 200 years afterward. The subjects on the pulpit at Siena, the third of these works, are the same as those on that at Pisa, with the substitution of the *Flight into Egypt* and the *Massacre of the Innocents* for the *Presentation;* and the enlargement of the concluding composition, the *Last Judgment.* In these compositions there is great felicity of invention and grouping, truth of expression and grace in attitudes and draperies; and in that of the *Last Judgment* the boldness displayed in the naked figures, twisted and contorted into every imaginable attitude, is wonderful, and evinces the skill with which P. drew on the antique and on nature. But it must be admitted that there is a degree of confusion or overfulness in the grouping. and that the heads of his figures are often large in proportion to the bodies, faults incidental to all early efforts. In this last work it appears by the contract for its execution, that P. was assisted by his scholars Lapo and Arnolfo, and his son Giovanni; and this accounts for a certain feebleness in portions of it. He died at Pisa, and was buried in the Campo Santo. P.'s influence on art extended widely; his pupils Arnolfo and Lapo executed numerous works at Rome, Siena, and other cities.—His son and heir in reputation, though not quite his equal in talent, GIOVANNI (about 1250–1330), was constantly engaged on works of importance; in Pisa, where the Campo Santo (for he was also an architect) was erected from his designs; in Naples, which he visited on the invitation of Charles I. of Anjou; at Arezzo, where he executed the marble shrine of St. Donato for the cathedral; at Orvieto, the bas-reliefs on the *facerata* of the Duomo, by many ascribed to P., being by him; at Pistoja, where he executed the pulpit, etc. After his death, probably about 1320, the Pisan school split into two principal branches, Florence and Siena; that of Naples also may be reckoned a branch, from the influence exercised over it by Giovanni.

PISCARY, n. *pĭs'kă-rĭ* [L. *piscārĭus*, relating to fishes; *piscātor*, a fisher—from L. *piscis*, a fish]: the privilege of fishing in the waters belonging to another. PISCATORIAL, a. *pĭs'kă-tō'rĭ-ăl*, or PIS'CATORY, a. *-tér-ĭ*, pertaining to fishes or fishing. PISCES, *pĭs'sēz*, the plu. of PISCIS, *pĭs'sĭs*, a fish [L. fishes]: in *astron.*, the twelfth sign of the zodiac, figured as two fishes. PIS'CINAL, a. *-sĭ-năl*, of or belonging to a fish-pond. PIS'CINE, a. *-sĭn*, pertaining to fishes. PIS'CICUL'TURE, n. *-sĭ-kŭl'tūr* or *-chûr* [L. *cultūra*, culture]: artificial method of propagating fish (see below). PIS'CICUL'TURAL, a. *-tū-răl*, pertaining to the artificial breeding and rearing of fish. PIS'CIFORM, a. *-fawrm* [L. *forma*, shape]: having the form of a fish; resembling a fish. PISCIVOROUS, a. *pĭs-sĭv'ō-rŭs* [L. *voro*, I devour]: fish-eating.

PISCATAQUA, *pĭs-kăt'a-kwa:* river about 80 m. in length, the s. part of the boundary between Maine and N. H., and forming at its mouth in the Atlantic the excellent harbor of Portsmouth.

PISCICULTURE, *pĭs'sĭ-kŭl-tūr,* or FISH-CULTURE: science and method of breeding and rearing fishes, for increase of the supply of food. Hitherto, except in America, it has been almost limited to fresh-water fishes; nothing having been done as to sea-fishes but by legislation—chiefly in the case of the herring—to prevent destruction of the very young fish, and that apparently to little advantage.

Ponds for fresh-water fishes have been common from remote antiquity. It appears from Isaiah, xix. 10, that they were used in ancient Egypt. In the times of Roman luxury, almost every wealthy citizen had fish-ponds. The Chinese have long bestowed more attention on P. than any other nation, and with them it is truly a branch of economy, keeping up the supply of food, fish being used as much as meat by rich and poor at every meal. In China a large proportion of fish for the markets of the interior are reared in ponds. Some of these ponds are generally placed in front of the villages, and large numbers of them spread over plains. A common way of rearing in that country is to keep a number of male and female fish in small ponds so as to furnish eggs. After these are hatched, and the young fish become two or three inches in length, they are transferred to larger ponds. At the end of six or eight months, they are caught and sent to market. Carp, perch, tench, and bream are some of the kinds kept in ponds. In some countries of modern Europe also, this branch of P. is prosecuted, particularly in Germany and Sweden, and of late years in France, for supply of fish for the market. P. in Germany has been found very remunerative.

The greatest improvement in P., and a most important branch of it, to which the term is often restricted, is the breeding of fish in artifical breeding-places, from which ponds and rivers may be stocked; or the art of fecundating and hatching fish-eggs, and feeding and protecting the young animals till they are of an age to secure their own food, and protect themselves from their numerous enemies.

In Germany, Jacobi bred trout artificially in the 18th c.; but commercial P. owes its origin to the French, the art having been practiced first by Remy, a poor fisherman who worked the streams of La Bresse in the Vosges. It was the great waste of eggs incidental to the natural system of fish-breeding that led Remy, about 1842, with a partner, Gehin, to try to repeople the fish-streams of his native district. His plan being successful, attracted the notice of many French savans, and led to perferment for Remy, whose new art was also taken up by the government. At Huningue in Alsace, on the Rhine, a gigantic fish-nursery and egg-dépôt was erected; and since the cession of Alsace to Germany, the operations of the establishment at Huningue (now known as Hüningen) have been conducted on a still larger scale by a German association.

PISCICULTURE.

Remy and Gehin's plan of rearing trout artificially was: to take the female when about to spawn and gently press on the abdomen, causing the ova or eggs to spurt forth from the body into a vessel of water. In the same way the milt was taken from the male. The pressing operation was repeated at intervals several times. The eggs were then well mixed with the milt, and the water changed so as to be constantly fresh. The fecundation being completed, the eggs were placed for security in a covered vessel. This was originally of zinc, perforated with small holes, and had a layer of gravel on the bottom. A limited number of eggs were inclosed in the box, and the box placed in a current of pure water and covered with pebbles, care being taken to let the water pass freely through, as it is necessary for the eggs to be slightly agitated. The hatching takes place in two to four months, the time depending on the nature of the water and other circumstances. After the hatched fish are fully formed, they are, after 8 to 15 days, set at liberty from the box; though much depends on the kind of fish that is being dealt with.

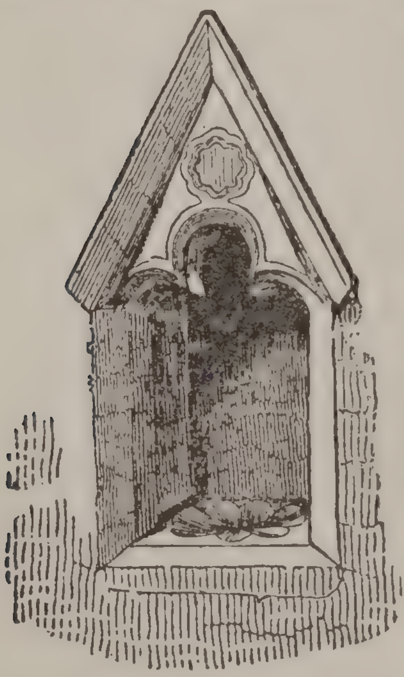
The most sustained effort in British pisciculture has been in connection with the salmon fisheries of the river Tay, although extensive fish-rearing establishments are owned by private parties. The hatching houses are built with great care, and frequently at great expense. A model house is regarded as requiring to be about 40 by 80 ft.; two stories high, and each story at least 10 ft. in height. The walls, built of brick or concrete, should be nearly two ft. thick; and the roof covered with a layer of concrete three inches thick; this in turn carrying a thin cover of asphalt. The entire outer shell of the building is thus a bad conductor of heat, so that it is not difficult to keep the inside water from rising above 46° Fahrenheit. Each floor has a considerable slope, which admits of the hatching or grill boxes being placed in descending series. These are each six ft. nine inches by one ft. seven inches in dimension. In the bottom of each box four wooden frames are neatly fitted, each of which has rather more than 100 glass tubes, about one-fourth inch diameter, placed transversely. Upon these glass grills the fish-eggs lie in parallel rows, looking like small pink beads. As fast as they hatch out and begin to take food, they are carried by a constantly flowing stream into successive cisterns or tanks. Many hatching-boxes and rearing-tanks are constructed of wood charred on the internal surfaces, and painted on the outside; slate also is used and sometimes earthenware, but in such cases they are of smaller size. When the fish arrive at the proper size and age, they are transferred to ponds, often very extensive and ingeniously planned both for beauty and convenience.

P. is practiced in the United States on a large and constantly expanding scale. The work begun 1837 by Seth Green, justly called the father of pisciculture, and successfully prosecuted 1864 and years following, has been productive of excellent results. In 1871 he transported the first shad ever taken to California, and as a result, a few years later, more than 1,000,000 shad were sold in the markets along the Pacific coast. The work is primarily under the care of the U. S. Commission of Fish and Fisheries, and secondarily, under that of state fish commissions and sportsmen's clubs. The U. S. Commission carries on its work by means of three steamers, specially built and equipped for the purpose, *Albatross*, *Fish-hawk*, and *Halcyon*, with a schooner, the *Grampus;* by marine stations at Gloucester and Wood's Holl, Mass., and St. Jerome, Md.; by stations for propagation of the *Salmonidæ* at Bucksport and Grand Lake Stream, Me., Cold Spring Harbor, N. Y., Wytheville, Va., Northville and Alpena, Mich., and Baird, on the McCloud river, Cal.; by stations for propagation of shad on Battery Island, near Havre de Grace, Md., on the Potomac at Washington (central station), at Fort Washington, Md., and on the Delaware river with headquarters at Gloucester City, N. J.; and by the station for propagation of carp at Washington, D. C. Besides supplying its own and the state and club hatcheries and waters, the U. S. Commission maintains an exchange of local eggs and fry with foreign countries, and is constantly experimenting with methods of transporting eggs and fry long distances, and seeking to determine the possibility of propagating various species of fish in other than their native water. Very many of the principal rivers and lakes, both small and large, have been successfully stocked through the labors of the commission. The eggs and young fry are shipped by car to previously designated localities, and received by local agents, are quickly deposited in their future natural homes, the hatching process being often accomplished while *in transitu.* In addition to the work done in stocking the American rivers with edible fish, vast numbers of eggs are from time to time shipped to Europe with greater or less success. While American fish are being transferred to European waters, European fish are planted in American waters, so that a very large variety is the result. To aid in selecting the right kind of fish for given localities, the fish commission have issued instructions, comprising a series of questions to be answered by the applicant. These questions relate to the geographical and geological features of the region, to the water, whether running or stagnant, whether with mud bottom, rock, or sand; its depth, area, spring supply or lake supply, etc. Thus are supplied the eggs and fry of the kind of fish that will best flourish in the locality.

The following table shows the distribution of eggs, fry, large fish, etc., by the U. S. Commission 1886, Jan. 1—1887, June 30. (In 1901-02 1,495,543,374 young fish were distributed, nearly 600,000,000 being white fish and 212,001,000 cod.)

Kind of Fish.	Eggs.	Fry.	Large.	Misc.
Whitefish	32,600,000	62,070,000		
Grayling			2	
Smelt		2,100,000		
Saibling	18,000			
Brook trout	82,000	7,488	1,711	
Lake trout		155,800	6,923	
Atlantic salmon	754,000	446,588		
Land-locked salmon	377,500	44,017		
Rainbow trout	429,000	49,930	16,482	
Brown trout	84,500	26,500		
Eels				200
Shad	10,718,000	99,752,000		
Carp		136,163		
Tench				1,202
Goldfish		2,805		
Brook pickerel				14
Rockfish		75,000		
White perch				6[illegible]
Black bass		48		
Sunfish				12[illegible]
Redeye		2,328		
Codfish		662,000		
Sole				1[illegible]
Lobsters		5,000		

Canada is not far behind the United States in the scale of her fish-breeding establishments. The 11 principal ones are owned by the govt., and their annual production aggregates 6,600,000 salmon eggs, 8,350,000 salmon-trout eggs. 43,000,000 eggs of whitefish (*Coregonus albus*), and 20,000,000 eggs of members of the Percidæ family, besides smaller numbers of other species.—Some years ago, the common or Atlantic salmon was introduced into Tasmania, and seems now thoroughly acclimatized, numbers of adult fish, besides shoals of the young, occurring in the rivers. One or more species of British trout also have become established in Tasmanian as well as in Australian and New Zealand rivers. At Otago there is a trout hatchery. In Victoria, the Californian salmon has been found to thrive better than the common species.—See further, PIKE: PERCH: CARP: OYSTER.



Piscina, Warmington.

PISCINA, n. *pĭs-sī'nă* [It. *piscina*, a pool or pond: L. *piscīna*, a fish-pond—from *piscis*, a fish]: in the Roman *thermæ* (warm baths), the large basin or *pond* of tepid water in which the bather might swim.—In the Rom. Cath. Chh., shallow stone basin usually in the form of a canopied niche, with a drain (usually leading directly to the earth), in which the priest washes his hands, and for rinsing the chalice at the celebration of the mass. It is often placed on the south side of the choir.

PISÉ, *pe-zā':* kind of work used instead of brick, etc., for the walls of cottages: it consists of loam or earth hard rammed into framing, which when dry forms a wall.

PISE, *pēz*, CHARLES CONSTANTINE, D.D.: 1802–1866, May 26: b. Annapolis, Md.; Rom. Cath. clergyman and author. He graduated at Georgetown Coll., D. C., and studied theology at Mt. St. Mary's Seminary, Emmittsburg, Md., at the same time acting as prof. of rhetoric and poetry. He was ordained priest 1825, and was for some years engaged in pastoral work in Baltimore. He then went to Rome and continued his theological studies, and received the degree of S.T.D: in recognition of his services as a writer, he was made chevalier of the Holy Roman Empire. Returning to the United States, he was assigned by his bishop to duty at Washington. At the instance of Henry Clay, P. was chosen chaplain of the U. S. senate. He next did missionary work in New York and Brooklyn till his death. His writings consist of stories, poems, histories, and biographies. His most considerable work was a *History of the Church* (5 vols., 1830).

PISEK, *pē'sĕk* (Boh. *Piscek*, sand): small town of Bohemia, on the right bank of the Wottawa, affluent of the Moldau; on a sandy plain (whence probably its name), 55 m. s.s.w. of Prague. The town is old, and contains the remains of a royal castle. Among other institutions are a school of arts and a high school. The manufactures are woolen and cotton fabrics, iron wire, and musical instruments. Pop. 10,545.

PISGAH, *pĭz'ga:* mountain range in Palestine, near Jericho; by some supposed to be also the name of the peak from which Moses viewed the Promised Land, and the place of his death. According to Prof. John A. Paine, who, 1873 made a careful investigation under the auspices of the Amer. Palestine Exploration Soc., P. is the mountain now known as Jebel Siâghah, in the Abarim range, about 4,500 ft. high and commanding a beautiful view of the surrounding region. This peak had been previously identified by the Duc de Luynes, but the results of his work were not published till those of Prof. Paine's research had been made known. The highest peak of the range is Nebo.

PISH, int. *pĭsh* [It. *pispissare*, to hush, to whisper very low; of imitative origin]: an interjection of contempt, equivalent to 'hold your tongue.'

PISH'AMIN: see DATE PLUM.

PISIDIA, *pĭ-sĭd'ĭ-ă:* ancient district of Asia Minor, with Phrygia on the n. and Pamphylia on the s.; now belonging to Turkey. The Taurus Mountains, which pass through the territory, were formerly inhabited by a warlike people whom even the Romans could not wholly subdue. Constantine made it a separate province. Among its products were olives, salt, and an excellent quality of wine. The apostle Paul, in his missionary work, made at least two visits to this region.

PISIFORM, a. *pī'sĭ-fawrm* [L. *pīsum;* Gr. *pīson*, a pea: L. *forma*, shape]: pea shaped; in *geol.*, occurring in small concretions like peas, as *pisiform iron-ore.* PISOLITE, n. *pī'sō-līt* [Gr. *lithos*, a stone]: a variety of limestone or carbonate of lime, found in globules like peas; still smaller ones are called *roestones* or *oolites.* PI'SOLIT'IC, a. *-lĭt'ĭk*, pertaining to pisolites.

PISIS'TRATUS: see PEISISTRATOS.

PISMIRE, n. *pĭz'mīr* [Eng. *piss*, urine, and OE. *mire*, an ant—from the sharp *urine* smell of an ant-hill: Dan. *myre;* Icel. *maurr*, an ant: comp. Gr. *murmēx;* L. *formica*]: the old name of the ant.

PISOLITE, *pī'sō-līt* [Gr. pea-stone]: concretionary limestone, differing from oolite in the particles being as large as peas.

PISS, n. *pĭs* [Dut. *pis;* Ger. *pisse*, urine: F. *pisser*, to pass urine: an imitative word]: urine: V. to make water; to discharge urine. PISS'ING, imp. PISSED, pp. *pĭst.*

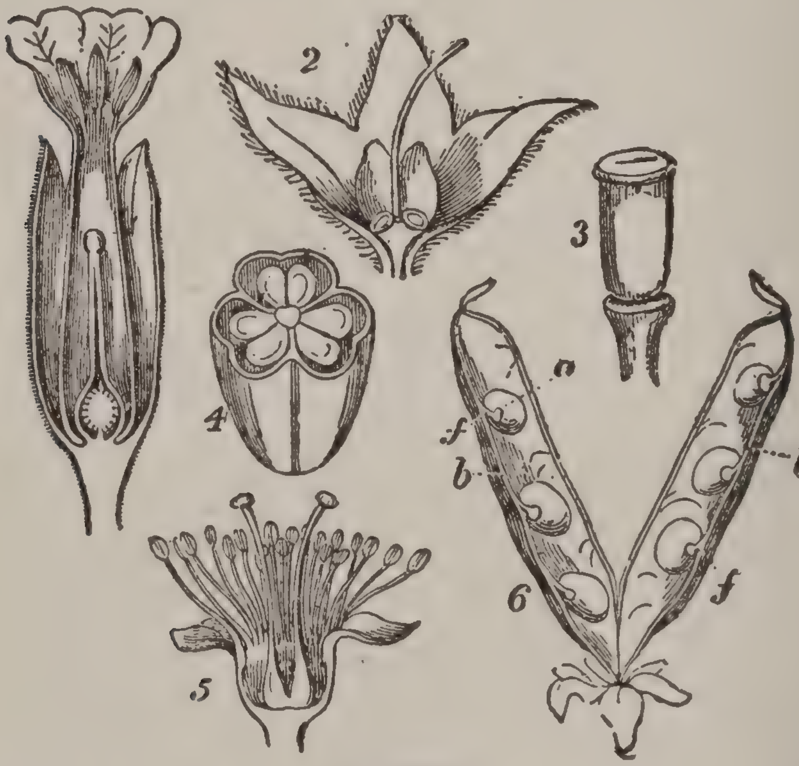
PISSASPHALT, n. *pĭs'ăs-fălt* [Gr. *pissa*, pitch; *asphal'-tos*, asphalt]: mineral pitch; the anc. Greeks gave the name *pissasphal'tos* both to the liquid and solid bitumen.

PISSOPHANE, n. *pĭs'sō-fān* [Gr. *pissa*, pitch; *phainomai*, I seem]: a mineral resembling pitch, of an olive-green or liver-brown color, having a vitreous lustre.

PISTACHIO, n. *pĭs-tā'shĭ-ō*, or PISTA'CIA, n. *-shĭ-ă* [F. *pistache;* It. *pistacchio;* L. *pistacĭŭm;* Gr. *pistakē;* Pers. *pistá*, the pistachio-nut]: genus of trees of nat. order *Anacardiaceæ*, having diœcious flowers without petals, and a dry drupe with a bony stone.—The PISTACIA or PISTACHIO TREE (*P. vera*) is a small tree about 20 ft. high, native of Persia and Syria, but now cultivated in all parts of s. Europe and n. Africa, and in many places naturalized. It has pinnate leaves, with about two pair of ovate leaflets, and an odd one; flowers in racemes; fruit ovate about the size of an olive. The stone or nut splits into two valves when ripe; the kernel, of bright green color, is very oleaginous, of delicate flavor, and with properties much resembling the sweet almond. In s. Europe and in the East, *Pistachio-nuts* are much esteemed; but as they readily become rancid, they are little exported. They are called sometimes *Green Almonds.* Oil is expressed from them for culinary and other uses. In cultivation, one male tree is allowed to five or six fertile ones. The tree is apt to be destroyed by a severe frost.—The MASTIC TREE, or LENTISK (*P. lentiscus*), yields the gum-resin called Mastic (q. v.): it is native of the countries around the Mediterranean.—The TURPENTINE TREE (*P. terebinthus*) yields the Turpentine (q. v.) known in commerce as *Cyprus Turpentine*, *Chian Turpentine*, or *Scio Turpentine*, which is of consistency somewhat like that of honey, greenish-yellow color, agreeable odor, and mild taste, and in its properties resembles the turpentine of the Coniferæ, but is free from acridity. It is obtained by making incisions in the trees, and placing stones for the turpentine to flow upon, from which it is scraped in the morning, before it is liquefied again by the heat of the sun. The tree is about 30 or 35 ft. in height; and has pinnate leaves, of about three pair of leaflets and an odd one; the flowers in compound racemes, the fruit nearly globular: the kernel of the fruit is oleaginous and pleasant.—The BATOUM TREE (*P. Atlantica*), round-headed tree of about 40 ft. in height, native of n. Africa, produces a fruit much used by the Arabs; and a gum-resin of pleasant aromatic smell and agreeable taste, which exudes from its stem and branches, is chewed to clean the teeth and impart a pleasant smell to the breath.—The fragrant oil of the kernels of *P. oleosa*, native of Cochin China, is used by the people of that country to impart a perfume to ointments.

PISTACITE, n. *pĭs′tă-sīt* [from its *pistachio*-green color]: variety of epidote occurring in prismatic crystals, also granular, earthy, and in crusts; lime and iron epidote.

PISTIL, n. *pĭs′tĭl* [F. *pistil*—from It. *pistillo*, a pistil; L. *pistillum*, a pestle—from *pinsĕre*, to pound, to crush]: in *bot.*, the seed-bearing organ, occupying the centre of a flower, consisting of an upper part or *stigma*, a central part or *style*, and a lower or *ovarium*, containing the young seeds called *ovules*. PIS′TILLA′CEOUS, a. *-lā′shŭs*, growing on the pistil. PIS′TILLARY, a. *-tĭl-lėr-ĭ*, connected with or pert. to a pistil. PIS′TILLATE, a. *-tĭl lāt*, having a pistil—applied to a female flower or plant. PIS′TILLIF′EROUS, a. *-lĭf′ėr-ŭs* [L. *fero*, I bear]: having a pistil without stamens, as a female flower; same as pistillate. PIS′TILLID′IUM, n. *-lĭd′ĭ-ŭm* [Eng. *pistil*, and Gr. *eidos*, resemblance]: in *bot.*, an organ in the higher cryptogams (see below).—*Pistil*, in botany, is the female organ of fructification in phanerogamous plants; that part of the Flower (q.v.) which, after flowering is over, is developed into the fruit. There is sometimes one P. in a flower, sometimes more; in some flowers, which have numerous pistils, they form a number of whorls, one within another, sometimes on an elevated receptacle or elongated axis, or, more rarely, they are spirally arranged. In every case the centre of the flower is occupied by the pistil or pistils, if present: see FLOWER. P. is formed either of a single Carpel (q.v.), as is the case when there are numerous pistils, or of several carpels combined; and the number of carpels of which the P. is formed is often indicated by the number of the cells of the germen, or by its lobes or angles. The P. usually consists of a Germen (q.v.) or ovary, in which the Ovules (q.v.) are contained, and which is surmounted by a *stigma*, either immediately or through the intervention of a *style;* but in Gymnogens (q.v.), there is neither germen, style, nor stigma, the female organs of fructification being mere naked ovules. The germen is always the lowest part of the pistil. The stigma exhibits an endless variety of forms, and is adapted to the reception and retention of the pollen grains requisite for fecundation, partly by the roughness of its surface—which is of somewhat lax cellular tissue, covered with projecting cells, often in the form of minute warts, and often elongated into hairs—and partly by secretion of a viscous fluid. The stigma when not *sessile*—or seated immediately on the germen—is supported by the style, which rises from the germen, and on whose top the stigma is generally placed. The style is sometimes very long and slender, sometimes very short; the germen sometimes passes imperceptibly into the style, and sometimes the style rises from it abruptly; and similar differences appear in the relations of the style and stigma; the stigma, however, may be regarded as always an expansion of the top of the style, though it is sometimes, but rarely, situated on one or both sides of the style, beneath its summit. In like manner, by peculiar modifications taking place in the growth of the germen, the style sometimes seems to arise from beneath its apex, or even from its base; but it always rises from what is, structurally considered, the real apex of the germen. When several carpels are united to form one germen, they are sometimes again separated in their styles, and more frequently in their stigmas, so that one germen bears several styles, or the style divides at some point above the germen, or one style is crowned by a number of stigmas. The style is usually cylindrical; and when this is not the case, it is often due to the combination of



Pistils:

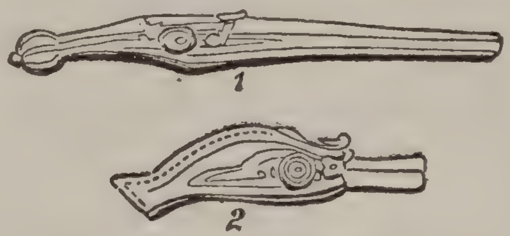
1, Section of flower of a species of Primrose, showing the pistil laid open; numerous ovules attached to a free central placenta. 2, Section of flower of Comfrey, with corolla removed, showing two of the four ovaries, and the style. 3, Pistil of the Barberry, consisting of several carpels combined; the style very short and thick, the stigma shield-like. 4, Section of the ovary of a Lily. 5, Section of flower of Cherry, showing pistil of two separate carpels, only one of which comes to perfection in fruit. 6, Pistil of Pea, opened; *a*. ovule; *b*, placenta; *f*, umbilical cord.—From Balfour's *Class-book of Botany*.

several styles into one, though sometimes the style is flat and even petal-like. It is traversed throughout its length by a canal, which, however, is in general partly filled by cells projecting from its sides, and often also by very slender tubes extending in the direction of its length; the function of the canal, to which the inclosed slender tubes are in some way subservient, being to bring about the connection between the pollen and the ovules for Fecundation (q.v). The length of the style is adapted to the ready fecundation of the ovules, being such that the pollen may most easily reach the stigma; and in erect flowers, the styles are usually shorter than the stamens; in drooping flowers, they are larger than the stamens. After flowering is over, when fecundation has taken place, the *foramen* of the ovules closes, the germen enlarges and ripens into the fruit, while each ovule is developed into a seed. The style and stigma meanwhile either fall off, or remain and dry up, or they increase in size, and are changed into various kinds of appendages of the fruit, as feathery awns, beaks, etc.

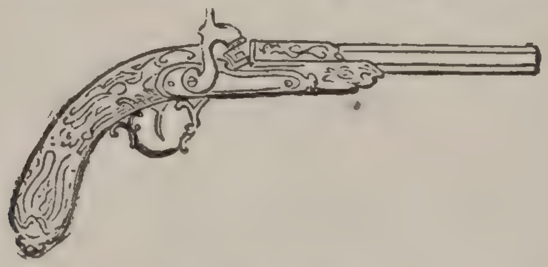
PISTILLIDIUM, *pĭs-tĭl-lĭd′ĭ-ŭm,* in Botany: term designating the organ that serves as ovary in some of the higher flowerless plants, such as ferns, though its product is spores (not seeds); these are fertilized by an organ, *Antheridium* (q.v.), of function similar to that of the pollen-producing anthers of flowering plants. The P., termed also *archegonium,* has its theoretic homologue in the corpusculum (necked ovum) of the Pine, the surrounding endosperm of which is thought to represent the fern prothallus. *Sporangium,* like the P., is a spore-case, but the word is now applied to the asexual spore-cases. The Pistillidia are very various in their forms and in the situations which they occupy in different orders and genera; being sometimes immersed in the substance of the plant, sometimes distinct from it, sometimes sessile, sometimes stalked, etc. See the titles of the higher flowerless orders.

PISTOJA, *pĭs-tō yâ* (anc. *Pistorium*): manufacturing town of Italy, province of Florence, 21 m. by railway n.w. of the city of Florence; on a gentle rising ground at the foot of the Apennines. It is well built; its streets are thoroughly Tuscan, and it is surrounded by lofty and well-preserved walls. The chief buildings are the cathedral, built at various times, and containing a number of good pictures; several old and interesting palaces, and a number of churches, some of which are important in the history of mediæval architecture and sculpture. The principal manufactures are iron and steel wares, and paper. Pop. (1881) 20,190.

PISTOL, n. *pĭs′tŏl* [F. *pistolet;* It. *pistola,* a pistol—originally a small dagger made at *Pistola* (the modern *Pistoja*) in Italy]: a small hand-firearm: V. to shoot with a pistol. PIS′TOLLING, or PIS′TOLING, imp. PIS′TOLLED, or PIS′TOLED, pp. *-tŏld.* PISTOL-SHOT, within range of a pistol. PIS′TOLET, n. *-lĕt,* a little pistol.—The *Pistol* is the smallest description of firearm, and is intended to be used with one hand only. Pistols vary in size from the delicate saloon-pistol, often less than six inches long, to the horse-pistol, which may measure 18 inches, sometimes 24 inches. They are carried in holsters at the saddle-bow, in the belt, or in the pocket. Every cavalry soldier should have pistols, for personal defense and for giving an alarm or signal.



Ancient Pistols:
1, Long Wheel-lock Pistol; 2, Pocket 'Wheel-lock Dag'—*temp.* Elizabeth.—From Fairholt's *Costume in England.*



Modern Pistol.

Sailors, when boarding an enemy's ship, carry each two in their waistbelts. As early as the reign of Henry VIII., the English cavalry carried clumsy pistols called 'dags.' The latest improvement on the pistol is the Revolver (q.v.).

PISTOLE, n. *pĭs-tōl′* [F.: connected in root with *pistol*]: name formerly of certain gold coins current in Spain, Italy, and parts of Germany. The P. was used first in Spain, and was originally equivalent to about 11 old French livres, but till 1728 it was merely an irregular piece of gold. From this time till 1772, its value was about $4.15; but decreased after this date till it reached the value of 80 reals, or about $3.93. The Italian pistoles also were gold coins, and varied considerably in value: that of Rome = about $3.34; of Venice = about $3.94; of Florence and Parma = about $4.10; and the old coin of Piedmont = about $5.49; or 24 old liras. Gold coins of this name formerly were current in Hesse-Cassel, Switzerland, Brunswick, and Hamburg; but were in most cases merely convenient multiples of the ordinary thaler and gulden. Of late years, and especially since the introduction of new systems of coinage in Spain and Italy, and of a uniform system in the German empire, the name P. is scarcely ever used.

PISTON, n. *pĭs′tŏn* [F. and Sp. *piston;* It. *pistone*, a piston—from L. *pistus*, bruised or pounded; *pinso*, I pound]: the plunger in a pump or steam-engine; a strong short rod of wood or iron, solid or hollow, with a valve fitted at the bottom, made to fit exactly the barrel of a pump, or the cylinder of a steam-engine, and to work up and down in it. **Piston-rod**, the rod connecting the piston with the external machinery.

PI'SUM: see PEA.

PIT, n. *pĭt* [AS. *pytt;* Gael. *pit,* a hole: F. *puits;* It. *pozzo,* a well: Dut. *put,* a well—from L. *putĕus,* a dug place]: a hollow or cavity, more or less deep, made by digging in the earth (see further, PIT, in Gardening): the shaft of a mine; a mark made by disease on the skin; any hollow or depression, as on the skin, under the arm, etc ; the hollow of the body at the stomach; a snare for wild beasts, consisting of a deep concealed hole in the ground; the lowest and central part of a theatre; the area on which cocks fight; whatever entraps; the grave; the bottomless pit: V. to indent with little hollows; to place in a pit or hole; to set against in competition, as in a combat—a phrase taken from cock-fighting. PIT'TING, imp. PIT'TED, pp. PITMAN, a worker in a pit in coal-mining. COAL-PIT, a deep excavation among the earth's strata from which coals are extracted. PIT-COAL, coal from pits. PITFALL, a hole or pit slightly covered as a trap. TO HAVE THE POWER OF PIT AND GALLOWS, to have power of imprisonment and death. COCK-PIT: see under COCK 1. *Note.*—The *pit of a theatre,* according to Wedgwood, is probably from Sp. *pátio,* the central court of a house, thence the pit which occupies the same place in a theatre.

PIT, in Gardening: excavation in the ground, intended to be covered by a Frame (q.v.), for protection to tender plants in winter, or for forcing vegetables, fruits, etc. Pits are often walled on all sides, though, in many small gardens, excellent use is made of pits which are mere excavations. The walls are often raised above the ground, particularly the back wall, to give slope to the glazed frame. A pit in which no artificial heat is supplied is called a *cold pit;* but when forcing is intended, flued pits are often used. Artificial heat is sometimes given by means also of fermenting matter. The ventilation of pits, as much as the weather will permit, is indispensable.

PITA-HEMP, *pē'tâ-hĕmp:* one of the names of the Agave or Aloe fibre: see AGAVE.

PIT'AKA (literally, 'basket'): Buddhistic term for a division of their sacred literature, occurring especially in combination with *tri,* 'three;' *tripit'aka* meaning the three great divisions of their canonical works, the *Vinaya* (discipline), *Abhidharma* (metaphysics), and *Sûtra* (aphorisms in prose); and collectively, therefore, the whole Buddhistic code. The term 'basket' was applied to these divisions, because the palm-leaves on which these works were written were kept in baskets, which thus became a part of the professional utensils of a Bhikshu, or religious mendicant.

PIT-A-PAT, ad. *pĭt-ă-păt'* [imitative of a quick succession of light blows]: with a flutter, as the heart: N. palpitation; light, quick, oft-repeated sounds.

PITCAIRN, *pĭt′kärn,* John: about 1740–1775, June 17; b. Scotland. In early life he entered the British army, and reached the rank of major 1771. In the troublous times preceding the revolution he was in command of the British forces at Boston, and was noted for his impartiality in treating disputes between his troops and the citizens. He commanded the advance force directed by Gen. Gage to gain possession of the bridges at Concord, ordered the dispersion of the militia whom he met at Lexington, and is said to have commenced the famous battle at that place by ordering his troops to fire on the rebels; but this was always stoutly denied by P., and is certainly open to doubt, as various accounts state that there had been considerable firing before the decisive command was given. He led the party which made the final assault at the battle of Bunker Hill, and received a fatal wound as he mounted the redoubt. The British govt. gave a pension of £200 to his widow.

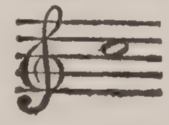
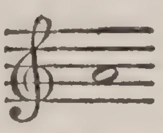
PITCAIRN ISLAND, *pĭt-kärn′:* solitary island in the Pacific Ocean, at the s.e. corner of the great Polynesian Archipelago; lat. 25° 3′ 6″ s., long. 130° 6′ w. Its length (2¼ m.) is about twice its breadth; area approximately 1¼ sq. m.; so that, except from its being the only station (except the Gambier Islands) between the S. American coast and Otaheite at which fresh water can be procured, it would be too insignificant for notice, except for the story of its colonization. The island is wholly surrounded by rocks; it has no harbor, and its soil is not very fertile. It was occupied 1790 by the mutineers of the *Bounty* (see Bligh, William), who, after touching at Toobouai, sailed for Tahiti, where they remained some time. Christian, leader of the mutineers, however, fearing pursuit, hastened their departure; and after leaving 16 sailors (of whom 14 were afterward captured, and 3 put to death 1792, Sep.) who preferred to stay on the island, they brought off with them 18 natives, and sailed eastward, reaching P. I., where they took up their residence, and burned the *Bounty.* They numbered then 9 British sailors and 6 Tahitian men, with 12 women. Concord was impossible in such a desperate band; and, in the next ten years, all the Tahitian men, all the sailors, except Alexander Smith (who subsequently changed his name to John Adams), and several of the women, had died by violence or disease. From the time of their leaving Tahiti, nothing had been heard of them, and their fate was known only when an American, Capt. Folger, touched at P. I. 1808, and on his return reported his discovery to the British govt.; but no action appears to have been taken by the latter. 1814, Sep. 17, a British vessel, the *Britain,* stopped at the island, and found old Adams still alive, commanding the respect and admiration of the whole little colony, by his exemplary conduct and fatherly care of them. Solitude and remembrance of early Christian instruction had wrought a powerful change in Adams; who had earnestly and successfully trained the children of his old companions in Christian faith and duty so that they had become as virtuous, amiable, and religious a little community as was ever seen. They were visited by British vesssels 1825 and 30, and the reports concerning them were corroborative of the previous accounts; but, in 1831, their numbers (87) had become too great for the island, and at their own request they were transported to Tahiti by the British govt. But, disgusted at the immorality of their Tahitian friends and relatives, they chartered a vessel, defraying part of its cost with the old copper bolts of the *Bounty*, and most of them returned to P. I. at the end of nine months. In 1839, being visited by Capt. Elliot of the British govt. ship *Fly*, they besought to be taken under the protection of Britain, on account of annoyances by lawless crews of whale-ships; accordingly, Capt. Elliot took possession of P. I. in the name of the queen, gave them a Union Jack, and recognized their self-elected magistrate as the responsible governor. He also drew up for them a useful code of laws. From this time, they were frequently visited by European ships; and, 1855, finding their numbers again too great for the island, they petitioned govt. to grant them the much more productive Norfolk Island, to which they were accordingly removed 1856. In 1859, however, two families, numbering 17 persons, returned to P. I., reducing the number on Norfolk Island to 202; and others have since followed. From their frequent intercourse with Europeans, the Pitcairn Islanders, while retaining their virtuous simplicity of character and cheerful hospitable disposition, have acquired the manners and polish of civilized life, with its education and taste. They are passionately fond of music and dancing, the latter evidently a legacy from their maternal ancestry. The men are engaged in whaling and herding cattle, or in cultivating their gardens and plantations; while the women (who seem the more industrious class) attend to their families, manage the dairies, and take occasional part in field-labor.

P. I. was discovered by Carteret 1767, and was named by him after one of his officers; but it was never visited by Europeans till taken possession of by the mutineers. When Admiral de Horsey visited P. I. 1877, there were in all 16 men, 19 women, 25 boys, and 30 girls on the island. Total pop. (1884) 130.

PITCH, n. *pĭch* [Ger. *pech;* Dut. *pik;* L. *pix;* Gr. *pitta*, pitch: W. *pyg*, pitch, rosin: connected in root with Gr. *peukē*, the fir; *pitus*, the pine]: the thick black substance obtained by boiling down common tar; the resinous juice of the pine or fir-tree. The common kind of pitch is the black residue which remains after distilling wood-tar: see TAR. It is made extensively in N. America, Norway, and Russia. As it protects wood from the action of water, it is used for calking the seams, and coating the outsides of ships and boats; it is also applied to the inside of water-casks, and has many similar uses. A variety of pitch is now obtained from distillation of coal-tar, and another from bone-tar; the latter is said to be nearly equal in value to that from wood, but coal-pitch lacks the toughness which is one of the more valuable qualities of wood-pitch. It is much used in making artificial asphalt for building and paving purposes; and for the black varnish used for coating iron-work to keep it from rusting. Pitch is solid at the ordinary temperature of our climate, but softens and melts with small accession of heat. Pitch, v. to smear or cover with pitch; to blacken; to obscure. Pitch'ing, imp. Pitched, pp. *pĭcht.* Pitchy, a. *pĭch'ĭ,* like pitch; smeared with pitch; dark; dismal. Mineral pitch, pine-resin. Burgundy pitch, *bĕr'gŭn-dĭ,* white pine-resin (see Burgundy Pitch). Pitch-like, dark in color; black. Pitch-black, black as pitch. Pitch-coal, a name for jet, referring to its pitch-like aspect. Pitch-dark, very dark. Pitch'blende, *-blĕnd,* a blackish ore of uranium and iron—called also Pitch-ore, a preparation of which is employed in imparting to glass a pale, opalescent, sea-green color, and also employed in porcelain-painting. Pitch-pine, one of the pines that abound in resinous matter. Pitch-stone, a glassy rock of a pitch-like appearance, occurring in dikes and disrupted masses.

PITCH, n. *pĭch* [W. *picell,* a dart or arrow; *picio,* to dart; *picellu,* to throw a dart: It. *picco,* a peak, a sharp point: *pitch* is a weakened form of *pick,* which see]: any degree of elevation or slope; slope or declivity, as of a hill or roof; a fall or throw; a throw at a point; a casting forward or down; the degree of acuteness or graveness of a sound, generally musical (see below): degree; position; in *mech.*, the distance between centres, as between two adjacent teeth of gearing: V. to fling or throw; to plant or set, as a camp or tent; to throw, as at a point; to cast forward; to ascertain by trial the key-note of a piece of music; to rise and fall, as a boat or ship on the water; to come to rest after flight; to plunge or fall headlong. Pitch'ing, imp.: Adj. descending or sloping, as a hill: N. act of throwing or casting; a setting or fixing; the alternate rising and falling of a ship's head and stern on the waves. Pitched, pp. *pĭcht:* Adj. fixed. Pitch'er, n. *-ĕr,* he or that which pitches or tosses. Pitched battle, a battle in which the opposing forces have taken up a fixed position, thus distinguished from a skirmish. Pitchfork, a farming instrument, pronged as a fork, for lifting and throwing hay or sheaves of grain; a small steel instrument, having two somewhat thin and broad prongs, which gives forth a fixed musical sound on the pressure and sudden release of the prongs (see Pitch, below). Pitch-pipe, a small wind musical instrument employed to find the pitch or elevation of a tune. Pitch-wheels, toothed wheels which work together. To pitch on or upon, to come suddenly down upon; to fix the choice upon.

PITCH, in Music: degree of acuteness or graveness of musical sounds. A musical sound is produced by a series of vibrations recurring on the ear at precisely equal intervals; the greater the number of vibrations in a given time, the more acute or higher is the P. In stringed instruments, the P. is dependent on the length, the thickness, and the degree of tension of the strings; the shorter and thinner a string is, and the greater its tension, the higher is the P. of the note. In wind instruments, where the notes are produced by vibration of a column of air, as in the mouth-pipes of an organ, the P. is dependent on the length of the column set in motion; the shorter the column of air, the higher the P. becomes.

The P. of musical instruments is adjusted by means of a tuning-folk, consisting of two prongs springing out of a handle, so adjusted as to length that, when struck, a particular note is produced, that note being C  in Britain, and A  in Germany. It is obviously important to have a recognized standard of pitch, by which instruments and voices are to be regulated; but there is, unfortunately, not the uniformity desirable in the P. in actual use. For a long time prior to 1859, concert-P. in Britain had been gradually rising, to the detriment of the voices of public singers. The C tuning-fork, in use 1699, made 489 vibrations per second; but in 1859 the number of vibrations had increased to 538. Hullah, 1842, in his numerous classes under governmental sanction, adopted 512, which has an especial convenience as being a power of 2. The French Imperial govt. 1858 fixed on 522. In 1859 a committee of the Soc. of Arts was appointed to consider the subject of a uniform musical P. Their deliberations lasted 12 months. Sir John Herschel, in a letter to the committee, strongly recommended the number 512. It was agreed on all hands that the then existing opera-pitch of 546 was too high and painful to the singers of soprano music. The instrumental performers stated that they could lower the P. to 528, but if they had to lower it to 512, some of them would have to purchase new instruments; and, in consequence apparently of their representation, the committee reported in favor of 528. In the U. S. the pitch for instruments has varied, with tendency on the whole to the higher European grades, against which singers have at times protested.

PITCHBLENDE, *pĭch'blĕnd,* or PITCH'-ORE: mineral, essentially oxide of Uranium (q.v.), with slight mixtures of other substances. Its color is grayish-black or brownish-black. It is infusible before the blow-pipe, without addition of borax, with which it fuses into a dull yellow glass. From P. is derived an orange pigment.

PITCHER, n. *pĭch'ėr* [OF. *picher;* W. *piser;* It. *pecchero, bicchiere,* a drinking-glass: Gael. *pigeadh,* a pitcher]: an earthenware or tin vessel for holding water. PITCHER-PLANT, a plant, a native of China and the East Indies, found growing in marshy situations, the leaves of which terminate in hollow vessels resembling water-pitchers, furnished with lids which open and shut, and which are **found filled with pure water—various species of *Nepen'thēs* (q.v.), ord. *Nepenthăcĕæ.***

PITCHER, *pĭch'ĕr*, Thomas Gamble: born Rockport. Ind., 1824, Oct. 23. He graduated from West Point 1845, participated in the principal battles in the Mexican war, served at various points in Texas, and reached the rank of capt. 1858. He was made brig.gen. vols. 1862; from 1863 till the close of the war was commissary and provost marshal, and was brevetted brig.gen. U. S. A. 1865. He was commissioned col. 1866, was supt. of West Point 1866–71, gov. of the Washington Soldiers' Home 1871-77, was retired 1878, and was supt. of the N. Y. Soldiers' and Sailors' Home, 1880-87.

PITCHFORK, *pĭch'fŏrk:* see under Pitch 2.

PITCH'STONE, *-stōn:* name sometimes given to a variety of common Opal (q.v.), brown, black, gray, red, or of mixed colors; the lustre more resinous than in opal, and the fracture less perfectly conchoidal.—The same name is given to another mineral (Ger. *Pechstein*), variety of Felspar (q. v.), occurring as a rock in dikes which traverse strata or in overlying masses; compact, slaty, or in concentric slaty concretions. It exhibits great variety of color, and has a somewhat resinous appearance. It often contains numerous imbedded crystals of felspar, and is then called *P. porphyry.*

PITCHURIM BEANS, *pĭch'ū-rĭm bēnz,* or Sas'safras Nuts: occasional article of export from S. America; the seed-lobes of *Nectandra Puchury*, a tree of the same genus with the Greenheart (q.v.), growing on the banks of the Rio Negro and elsewhere in the rich, alluvial parts of the basin of the Amazon. They are about an inch and a half long, and half an inch broad. They are in demand among chocolate manufacturers for flavoring, as a substitute for vanilla. They are sometimes called Wild Nutmegs, because of a resemblance to nutmeg in flavor. The name Sassafras Nuts also is due to the flavor, which approaches that of Sassafras bark; and the tree belongs to the same nat. order with the Sassafras tree.

PITEOUS, a. *pĭt'ē-ŭs* [see Pity]: deserving or exciting compassion; sorrowful; mournful; in an *ill sense,* paltry; poor. Pit'eously, ad. *-lĭ.* Pit'eousness, n. *-nĕs,* state of being piteous.—Syn. of 'piteous': pitiful; pitiable; despicable; contemptible: sorrowful; mournful; affecting; doleful; woful; miserable; wretched; tender; compassionate.

PITH, n. *pĭth* [AS. *pidha;* Dut. *pit;* Low Ger. *peddik. picke*, pith, kernel]: the soft spongy substance in the centre of plants and trees (see below): the best of a thing; strength; force; closeness and vigor of thought and style; summary; applied to the spinal column of nervous matter: V. to remove the pith from. Pith'ing, imp. Pithed, pp. *pĭtht.* Pith'less, a. *-lĕs,* without pith; wanting in strength or energy. Pithy, a. *pĭth'ĭ,* abounding with pith; forcible; energetic. Pith'ily, ad. *-lĭ,* with energy or vigor. Pith'iness, n. *-nĕs,* the quality or state of being endowed with energy or vigor; concentrated force.—Syn. of 'pith, n.': strength; force; energy; cogency; weight; moment; quintessence; marrow.

PITH (*Medulla*): light cellular substance which occupies the center of the stem and branches in exogenous plants. In the earliest stage of a young stem or branch, it is composed entirely of cellular substance and bark; the vascular bundles or woody fibre appearing afterward, and in trees and shrubs, generally increasing, so as to constitute the greater part of the substance of the stem and branches, while the P. is ultimately reduced to a very small column in the centre. The P., however, exists even in the most mature woody stem, and maintains its connection with the bark by means of *Medullary Rays*, analogous in their character to the P. itself, and which exist even in the most compact wood, though much compressed by the woody layers, and in a transverse section appearing as mere lines. The medullary rays convey to the central parts of the stem the secretions of the bark necessary for nourishment. P. is in general composed entirely of cellular tissue; vessels occurring in it only in a few plants. Its cells diminish in size from the centre toward the circumference. In a few plants, it exhibits cavities in a regular arrangement; in many herbaceous plants of rank growth, large irregular cavities occur in it. The P. is surrounded by a thin vascular layer the *Medullary Sheath*, consisting chiefly of spiral vessels, which continue to exercise their functions during the life of the plant.

PITHE′CIA: see SAKI.

PITHE′CUS: see ORANG.

PI′THOM: see SUCCOTH.

PITIABLE, PITIER, PITIFUL, PITILESS, etc.: see under PITY.

PITKIN, *pĭt′kĭn*, TIMOTHY, LL.D.: lawyer: 1766, Jan. 21—1847, Dec. 18; b. Farmington Conn.; son of the Rev. Timothy P. He graduated from Yale College 1785, became a lawyer, was a member of the legislature several years, speaker of the house five successive terms, and member of congress 1805–19. He published *A Statistical View of the Commerce of the United States of America* (1816) of which three editions were issued, and *A Political and Civil History of the United States of America from the Year* 1763 *to the Close of Washington's Administration* (1828, 2 vols.). He died at New Haven.

PITMAN, *pĭt′man*, SIR ISAACS 1813, Jan. 4—1897, Jan. 22; inventor of the Pitman system of phonography, the method now most generally in use (see SHORTHAND); born at Trowbridge, Wilts., England. He was educated at the British and Foreign School Society of London; in 1832 began to teach at Barton-on-Humber; and in 1837 he published *Stenographic Soundhand.* The latest and most important treatise on phonography is the *Shorthand Instructor.* For over fifty years he edited the *Phonetic Journal*, and issued a library of shorthand works ranging from the complete *Bible* to *Tom Brown's School Days*, and other popular fiction of the day. For many years he was greatly interested in the subject of reform in English spelling. He was knighted in 1894 for his 'great services to stenography.'

PI'TO, or Po'so: see CHICA.

PI'TON BARK: see CARIBBEE BARK.

PITRA, *pē-trâ'*, JEAN BAPTISTE: cardinal: b. Champforgueil, France, 1812, Aug. 31. He was educated for the priesthood, and after teaching for a while, joined the benedictine order of monks at Solesme. He made a special study of ecclesiastical antiquities, and published in five vols. a collection of documents throwing much light on church history, materials for which were obtained in the principal libraries of Europe. Under the direction of the pope he visited Russia, 1858, for special study. He became a member of the Sacred College 1862, was made a cardinal 1863, and a cardinal-bishop 1879. In addition to the work above named, he has published biographies, and various books relating to church history. Since 1869 he has held the office of 'librarian of the Holy Roman Church.'

PI'TRI [Sanskrit, literally, 'father'= Latin *pater*, in the plural *Pitaras;* but in Eng. translations from the Sanskrit usually Anglicized to *Pitr'is*]: in a general sense, the deceased ancestors of a man; but in its special sense in Hindu mythology, an order of divine beings inhabiting celestial regions, and receiving into their society the spirits of those mortals for whom the funeral rites (see S'RÂDDHA) have been duly performed. They include, therefore, collectively the manes of the deceased ancestors; but the principal members of this order are beings of a different nature and origin. According to Manu, they were the sons of Marîchi, Atri, Angiras, and the other R'ishis or saints produced by Manu, son of Brahmâ; and from them issued the gods, demons, and men. According to several Purânas (q.v.), however, the first Pitr'is were the sons of the gods; and to reconcile this discrepancy, a legend relates that the gods having offended Brahmâ by neglecting to worship him, were cursed by him to become fools; but upon their repentance, he directed them to apply to their sons for instruction. Being taught accordingly the rites of expiation and penance by their sons, they addressed the latter as fathers; whence the sons of the gods were the first Pitr'is (fathers). See Wilson's *Vishn'u-Purân'a.* Manu enumerates various classes of Pitr'is in defining those who were the ancestors of the gods, those who were the ancestors of the demons, and those from whom proceeded the four castes severally; but he adds, at the same time, that these are merely the principal classes, as their sons and grandsons indefinitely must likewise be considered as Pitr'is. The Purân'as divide them generally into seven classes, three of which are without form, or composed of intellectual, not elementary substance, and assuming what forms they please, while the four other classes are corporeal. In the enumeration, however, of these classes the Purân'as differ. The Pitr'is reside in a world of their own, Pitr'i-loka, sometimes supposed to be the moon; according to the Purân'as, it is below the paradise of Indra, and is the abode also of the souls of devout Brahmans. As to their worship, described in the Purân'as see S'RÂDDHA. See Wilson's *Vishn'u-Purân'a.*

PITT, William: 1759, May 28—1806, Jan. 23; second son of the Earl of Chatham and of Lady Hester Grenville, daughter of the Countess Temple. His genius and ambition displayed themselves with almost unexampled precocity. 'The fineness of William's mind,' his mother writes, when he was 12 years old, 'makes him enjoy with the greatest pleasure what would be above the reach of any other creature of his age.' Excessive delicacy of constitution prevented education at a public school, but he studied at home with success; and in 1773 he was sent to the Univ. of Cambridge, where his knowledge of the classics seems to have astonished veteran critics. To modern literature he appears to have been indifferent—he knew no continental language except French, and that imperfectly. Among English poets, he liked Milton best; the debate in Pandemonium being his favorite passage. In 1780 P. was called to the bar. He took chambers in Lincoln's Inn, and joined the western circuit. A general election having taken place in the autumn of the same year, he stood for the Univ. of Cambridge; but he was at the bottom of the poll. Through the influence of the Duke of Rutland, he obtained a seat in parliament as member for Appleby. Lord North was prime-minister. The opposition consisted of two parties; one led by Rockingham and Fox, the other by Lord Shelburne. The latter consisted chiefly of the old followers of Chatham; and to this party Pitt naturally became attached. 1781, Feb. 26, he made his maiden speech. It was in favor of Burke's plan of economical reform, and was a splendid success. 'It is not a chip of the old block,' said Burke; 'it is the old block himself.' Shortly before the meeting of parliament, in the autumn of 1781, the news arrived of the surrender of Cornwallis and his army. In the debate on the address, P. spoke with even more energy and brilliancy than on former occasions. No one was so loud in eulogy as Henry Dundas, lord advocate for Scotland; and from this night dates a connection between him and P., broken only by death. After several defeats the ministry resigned; Rockingham was called on to construct a cabinet. P. was offered the vice-treasureship of Ireland; but he declined to accept a position which did not confer a seat in the cabinet. 1782, May 7, he made his first motion for reform in the representation of the people; which was lost by only 20 votes in a house of more than 300 members. The reformers never again had so good a division till 1831. At the end of 3 months after his accession to office, Rockingham died; Lord Shelburne succeeded to the head of the treasury; and P., at the age of 23, became chancellor of the exchequer. In opposition to the govt., there was then formed a coalition known as 'The Coalition.' On Lord Shelburne's resignation 1783, the king, who hated the Coalition, tried to persuade P. to take the helm of affairs; but he declined. The Duke of Portland succeeded, with Fox and North as secretaries of state. P., from the opposition benches, brought for a second time the question of parliamentary reform before the house. His motion was lost by 293 votes to 149. On the prorogation, he visited the continent for the first and last time. In 1783, the ministry having been defeated on a motion for transferring the government of India to parliament, P. became first lord of the treasury and chancellor of the exchequer. But parliament was against him: in 16 divisions, 1783, Dec. 17—1784, Mar. 8, he was beaten. The nation, however, was in his favor; both on account of his policy, and from admiration of his private character. Pecuniary disinterestedness is what all can comprehend; and even when known to be overwhelmed with debt, when millions were passing through his hands, when the greatest men in the land were soliciting him for honors, no one ever dared to accuse him of touching unlawful gain. At the general election (1784) 160 supporters of the Coalition lost their seats, P. himself heading the poll for the Univ. of Cambridge. He was now, at 25 years old, the most powerful subject that England had seen for many generations. He ruled absolutely over the cabinet, and was the favorite at once of the sovereign, of the parliament, and of the nation; and from this date his life becomes the history of England. For 17 eventful years he held his great position without a break. In 1784 he established a new constitution for the E. India Company. In 1786 he carried through a commercial treaty with France on liberal principles. In the same year he established a new sinking fund; a scheme which experience has shown wrong in principle, though long viewed with favor by the nation. To exertions which then began for abolition of the slave-trade, he gave the help of his eloquence and power. 1788–9 he maintained against Fox the right of parliament to supply the temporary defect of royal authority occasioned by the incapacity of the king. The year 1793 saw the beginning of the great war with France. It is certain—though authorities differ as to the cause—that P.'s military administration was eminently unsuccessful. But no disaster could daunt his spirit. When a new French victory, a rebellion in Ireland, a mutiny in the fleet, and a panic in the city had spread dismay through the nation, P. from his place in parliament poured forth the language of inextinguishable hope and inflexible resolution. Disaster abroad was regularly followed by triumph at home, until at last he had no longer an opposition to encounter. In 1799 he effected the union with Ireland. It was part of his scheme to relieve the Rom. Cath. laity from civil disabilities, and to grant a public maintenance to their clergy; but the obstinacy of the king frustrated this design. Chagrined by this failure, P. resigned office 1801. He was succeeded by Addington, to whom for a while he gave his support. In 1804 he returned again to the head of the treasury, which position he held till his death. His death was doubtless hastened by the stupendous success of Napoleon. The peculiar look which he wore during the last days of his life was pathetically termed by Wilberforce 'the Austerlitz look.' The impeachment also of his friend, Lord Melville, is supposed to have hastened his end. It gave him, he said in parliament, a deep pang. His voice quivered as he uttered the word; and it seemed as if the man of iron were about to shed tears. 'He was,' says Macaulay, 'a minister of great talents, honest intentions, and liberal opinions, . . . but unequal to surprising and terrible emergencies, and liable in such emergencies to err grievously, both on the side of weakness and on the side of violence.' But what man ever lived, we may ask, who, placed in such circumstances as P., would not often have greatly erred? His policy was liberal beyond his age, at least he wished it to be so, though he was often obliged to yield to the prejudices of his sovereign. He resigned office because he could not carry Rom. Cath. emancipation. He laid before the king unanswerable reasons for abolishing the Test Act. He was more deeply imbued with the doctrines of free-trade than either Fox or Grey. It cannot indeed be denied that he was addicted to port-wine, and that he died overwhelmed with debts; parliament voting £40,000 to his creditors. High as his character stands, it would have stood higher had he united the virtue of frugality to that of disinterestedness. See *Life of Pitt* by Lord Stanhope (Lond. 1861); also Lord Macaulay's *Biographies* (Edin. 1860). In the former work, II. 185, is a valuable criticism on Macaulay's memoir.

PITT, WILLIAM, Earl of Chatham: see CHATHAM, Earl of.

PITTA, *pĭt'tâ:* genus of gaily colored birds, which with several other genera form the family *Pittidæ,* order *Clamatores.* They have been known as ant-thrushes; but they are neither of the thrush family and its order, nor are they ant-eaters otherwise than insectivorous in general. Though numbering 50 species, the family seems to be a declining one, confined with few exceptions to the E. Indies, at a maximum in Borneo and Sumatra. What is remarkable is that small islands have their own one or two species, and this Dr. Wallace mentions as one of many similar facts in favor of isolation producing species. The most brilliantly colored are on the smaller islands. The family and the S. American tanagers are almost the only groups of birds that have no set of characteristic colors, the species exhibiting usually three colors at least, but these may be any colors —blue, crimson, green, yellow, purple, black, or white. *P. coronata,* ranging from the Himalayas to Ceylon, combines black, white, fawn, rose-red, and sky-blue. P. *angolensis* is the one African species. The song of the Pittas is mostly two notes of plaintive whistling. Other names for them are Cittas and Breves, and they were formerly classed as *Brachyuridæ.*

PITTACAL, n. *pĭt'tă-kăl* [Gr. *pitta,* pitch; *kalos,* beautiful]: a solid substance of a fine blue color, obtained from the oil of wood-tar.

PITTACUS, *pĭt'ta-kŭs:* one of the 'Seven Wise Men' of anc. Greece: B.C. 651—B.C. 569; b. at Mitylene, in the island of Lesbos. The incidents of his life do not rest on a secure historical basis; but he is not to be deemed a merely traditionary personage. Doubtless his career and character were substantially what later history represents them. About B.C. 611, in conjunction with the brothers of Alcæus the poet, he overthrew the 'tyrant' Melanchrus, and put him to death. He next figures in the contest between the Lesbians and the Athenians for possession of Sigeum in the Troad, and showed as much valor on the battle-field as Alcæus did cowardice. His townsmen, the Mitylenæans, were so pleased with his deeds of prowess, that they gave him a portion of the city territory, which he dedicated to sacred uses, and which was known long after as the 'Pittaceian land.' Meanwhile, the civic struggles did not cease; the democratic party, roughly represented by a series of popular 'tyrants,' were in the ascendant, and the oligarchic aristocrats, at the head of whom was Alcæus, were finally banished. P. was subsequently chosen dictator, B.C. 589, to prevent the turbulent exiles from returning to Mitylene, and ruled absolutely with great success for ten years, after which he voluntarily withdrew into honored retirement. Many of the traditional anecdotes concerning P. are dubious; but they all attribute to him the same characteristics—great moral sagacity, a contempt of pomp, and a plain practical understanding. His favorite maxim, *Gnōthi Kairòn* ('Know the fitting moment'), may be commended to all statesmen and politicians. Of his 600 didactic verses, only four are extant, and these show that he was strongly impressed with the falsehood and insincerity of men. See Schneidewin's *Delectus Poesis Græcorum Elegiacæ*, etc.

PITTANCE, n. *pĭt'tăns* [It. *pietanza;* Sp. *pitanza;* F. *pitance*, allowance of appetizing food, allowance of food for a single person—from mid. L. *pictantia*, the allowance of esculents or appetizing food to a monk or nun, valued at a *picta*, a small coin issued by the Counts of Poitiers]: any small portion allowed or assigned, particularly applied to money.

PITTOSPORACEÆ, *pĭt-tō-spō-rā'sē-ē:* natural order of exogenous plants, allied to *Vitaceæ* (the Vine, etc.), and containing nearly 100 known species of trees and shrubs, chiefly Australian, though a few are natives of parts of Asia, Africa, and the islands of the Pacific. To this order belongs the genus *Billardiera* (q.v.). The genus *Sollya* also deserves notice, as containing beautiful greenhouse climbers.

PITTSBURG: city, Crawford co., Kan.; on the Atchison, Topeka and Santa Fé, the Kansas City, Pittsburg and Gulf, the Missouri Pacific, and the St. Louis and San Francisco r.rs.; 55 m. e. of Independence. P. is in a coal-mining region; has large deposits of coal, zinc and brick works and other manufactories, 8 churches, 3 banks, good public schools, and 4 newspapers.—Pop. (1890) 6,697; (1895) 8,982; (1900) 10,112.

PITTSBURG, *pĭts'bėrg:* city, cap. of Allegheny co., in w. Penn.; lat. 40° 27′ n., long. 79° 59′ w.; 800 ft. above sea-level; 480 m. s.w. of Boston, 315 m. w. of New York, 258 m. n.w. of Philadelphia, 257 m. n.e. of Cincinnati, 412 m. e.s.e. of Chicago.

Topography.—P. (1903) has an area of 28¼ sq. m., between the Allegheny and Monongahela and s. of the latter, while the sister city Allegheny adds 7⅓ sq. m.—in all 37 sq. m. extending over 9 miles from e. to w., and of a width varying from 2 to 4 m. The central point from which growth began is that between the Monongahela and Allegheny rivers, where they meet to form the head of the Ohio, inclosing a plain of triangular form and about ¾ of a m. along each side, with hills e. of its base across from river to river. The slope of these hills, for about a mile and a half back e. from the business quarter, is closely built with residences, stores, retail shops, etc., except some summits which rise 400 or 500 ft. high, and are partially unoccupied. Still farther back a rolling country extends 5 m., with a breadth of about 2 m., occupied by residences. On the banks of the two inclosing rivers a strip of low ground, usually a few hundred ft. wide, affords sites for manufacturing establishments, which extend 2 m. or more down the Ohio and 7 m. up the Monongahela and the Allegheny. At different points these strips of low river ground are widened by the falling back of the precipitous hills facing the rivers, and afford sites for suburbs across the Monongahela. The various quarters of the combined cities of P. and Allegheny have been united by ten bridges for ordinary traffic and several railway viaducts. A new railroad bridge for connecting Brunot's Island in the Ohio river, just below P., with the mainland, has a central span 525 ft. long, and of 1,800 tons weight, the floating of which to its position, 1890, Aug. 19, was a very remarkable engineering feat.

The notable buildings are the U. S. arsenal, built 1814, Carnegie Library and Institute, Phipps Conservatory, St. Margaret's Hospital, etc. The city-hall, on Smithfield st., of solid white sandstone (cost $700,000), the U. S. post office and court-house, and the new county court-house, both built 1884. The finest church buildings are St. Paul's Cathedral (Rom. Cath.), Trinity and St. Peter's (Prot. Episc.), the 1st and 3d Presb., and Ger. Luth. in P.; and the N. Presb. in Allegheny. The theatres are the Grand Opera, Duquesne, Bijou, Acad. of Music, and Harris's.

Manufactures.—Of the production of pig-iron in the United States, which in 1890 led the world, the apparently permanent principal centre is P., which is the centre still more for finished iron and steel. Blast-furnace practice in P. and in America reached an era of large yields 1880 with the putting in of the Edgar Thomson furnaces, which, with one brief interruption, have kept at the front of pig-iron production. For 1883 the iron and steel industry showed 16 blast-furnaces, 32 rolling-mills, 20 steel mills, and 91 other establishments producing great variety of manufactures in iron and steel. The blast-furnaces and rolling-mills at this date represented $23,910,000 in capital, employing 21,190 persons; and the steel mills $10,170,000 in capital, employing 7,060 persons. For several years from 1883 the highest number of furnaces in operation for making pig-iron was 17, with output rarely exceeding 2,000 tons a day. There were (1891, Jan.) 26 furnaces with daily production of 4,500 tons, and capacity for more than that. The raw material consumed in making pig-iron 1890 was 4,500,000 tons; divided into ore 2,500,000, coke 1,325,000, limestone 675,000. Besides the pig-iron manufactured in the city, there is annually brought to P. for manufacture 1,250,000 tons of iron and steel, which is nearly one-fifth (18½ per cent.) of the product of the whole country. The tonnage of pig-iron for P. is about 1,300,000 tons; that of rail and bar iron 500,000; steel and plate 150,000; nails 200; crucible ingots 56,000; all other steel, including Bessemer, 1,100,000; total, 3,106,200. A 13-ton open-hearth melting-furnace was the largest known to P. 1884, and the first 20-ton furnace was put in 1885. Now two leading firms together have ten melting-furnaces, each with a capacity of 30 tons. In 1900 P. had 36 iron and steel establishments, with $75,149,146 cap. and 24,400 employees; value of products $90,798,086. There were 83 for the manufacture of foundry and machine shop products, with capital of $14897,525; 6,359 employees; value of products, $15,545,561; electrical apparatus and supplies, 8 concerns; cap. $16,070,038; value of products $14,013,450.

The glass-works of P. had developed, before the census of 1880, an importance second only to that of the iron and steel industry. The first glass-making of P. is said to date from 1795; from 1796 works were in operation; from 1810 one establishment was in operation which has made flint-glass till the present time. The number of glass-factories and value of their output at different dates has been (1813) 5 factories, $160,000 output; (1837) 13 factories, $700,000 output; (1857) 33 factories, $2,631,990 output; (1865) 45 factories, $6,100,000 output; (1883) 75 factories, output $6,832,683; (1900) 16 factories, with capital of $3,588,202, 2,104 employees; wages paid $1,132,985; value of output $2,429,686.
Window-glass manufacturers alone consume 70,000 tons of material, and their output is 57,250 tons. The P. Plate Glass Co. pays annually as much as $200,000 for freight The large number of tableware houses of P. figure largely in the tonnage by rail.

The various Westinghouse companies listed on the P. stock exchange represent a capitalization of $23,170,000. The total number of manufacturing establishments in P. (1900) was 1,938; the total capital employed $193,162,900; number of employees (of whom 5,873 were women) 69,980; wages paid, $36,684,563; cost of materials, $116,833,174; value of products $203,261,251.

Coal Oil.—In the great western bituminous coal basin of Penn., 'the great P. seam' lies central to the whole field, and the P. district of coal-mines supplies about half the total of soft coal for the U. S. The oil-wells of the region on the north have made P. the centre of the oil trade of the world. From the date of the first well, 1859, Aug., to 1867, P. supplied over 60 per cent. of the whole foreign exportation of petroleum, and of the output of w. Penn., Ohio, and W. Va. for over 40 years, it has been the chief mart.

The inland water communications of P., by river and canal, have been important in its history. Till 1855 the principal route from the middle states to the s. and s.w. was that of the Ohio river and its connections. The shipment of coal by fleets of barges on the Ohio aggregated (1880–90) 316,840,000 bushels to Cincinnati, and 555,542,000 bu. to Louisville, the great coal mart for points farther south. The shipment (1901) was 24,300,000 short tons. With a reasonable stage of water and no strikes, the annual shipment would be about 100,000,000 bushels.

Natural Gas.—Natural gas came very prominently to public notice 1878, with an extraordinary outburst from a well which was being driven for oil, at Murraysville, 18 m. e. from P. It was largely wasted the first four or five years, but meanwhile began to be successfully used for steel works near P., and in 1884 was piped to P., and came rapidly into general use, both for domestic fuel and light, and for fuel in the great iron, steel, and other works. The gas-field of richest output was within a circle 50 m. across, to which P. is the centre, and within a short time 12 lines of pipe were employed to convey the gas into P., and there are now numerous companies controlling more than 100 wells, with an aggregate capacity for delivering over 25,000,000 cub ft. of gas daily. The Philadelphia Nat. Gas Co., by far the largest source of supply, furnishes gas for heat and light to more than 400 manufactories and 7,000 dwellings. The general use of gas relieved P. of the plague of smoke; but a shortage appeared 1890, Aug., and in Nov. began to compel large consumers to forego its use, and return to coal, until, this becoming general, the heavy smoke-fog was again seen at its worst, Dec. 6, and with the coldest day of the winter, 1891, Feb. 4, the failure of gas was so general as to cause suffering from cold generally, and stoppage of works still using it.

Railroads.—The city is one of the great gates between the eastern and mid-continent states; and the railroad development of which P. is centre is immense. It embraces the lines of the Penn. r.r. system, those of the Baltimore and Ohio system, and the P. and Lake Erie, connecting with the N. Y. Central system. The total tonnage of P. by rail 1890, was 27,000,000 tons, equal to 110,000 cars every month, with average capacity of 25 tons and load of 20 tons. P. alone handles 18,000,000 tons per annum, or 1,000 cars daily. The cars, entering, bring in 40,000 tons per day, and there are redistributed daily 20,000 tons. The coal and coke industry shows the greatest tonnage. In Allegheny co. (750 sq. m.) there are 81 mines, whose output (1901) was 23,300,000 short tons. The coke output aggregates 5,000,000 tons.

Religion.—The churches of P. with Allegheny City number 276; of which there are 52 Rom. Cath., including St. Paul's Cathedral, reopened 1890, Dec. 8, by Cardinal Gibbons, with the high mass for the first time in P.; 37 Meth. Episc.; 33 Presb.; 29 United Presb.; 26 Evangelical Luth.: 19 Prot. Episc.; 19 Bapt.; 10 United Evangelical Prot.; 8 Meth. Prot.; 8 African Meth. Episc.; 6 Ref. Presb.; 5 Evangelical Assoc.; 4 Congl.; 4 Disciples; 4 Jewish; 3 Ref. Church; and one each Unitarian, Universalist, Cumberland Presb., Primitive Meth., Wesleyan, Church of God, New Jerusalem, Reorganized Latter-Day Saints, and Hungarian. P. has 152 Sunday-schools, and Allegheny 66 more, enrolling 36,773 pupils in P. and 20,094 in Allegheny.

Education.—P. has a number of institutions for higher education, including Holy Ghost College (R. C.), with some 250 students; Western University (the outgrowth of P. Academy, chartered 1787, with about 870 students and a library of 20,000 vols.; a normal school, a school for the education of the blind, a school of design, three colleges for women, seven seminaries, eight academies, and a large number of kindergartens. The value of the high school buildings exceeds $500,000. In 1900 Andrew Carnegie pledged $5,000,000 to erect and endow a great technical school. It was announced in 1902 that Henry C. Frick would found a university in P. In 1900-01 P. had 46,317 pupils enrolled in its public schools, and the value of school property was $3,500,000. The Carnegie Library and Institute, erected at a cost of $5,000,000, and having an endowment of $2,000,000, is one of the chief institutions of the city. The library has more than 100,000 vols. There are 10 daily and 50 weekly newspapers and 10 monthly magazines.

Among benevolent institutions are such hospitals as the City General; the Mercy, the W. Penn., with dept. for insane at Dixmont; the Homeopathic and dispensary; the P. Infirmary, and P. Dispensary; several homes under various church auspices; and the Rom. Cath. Orphan Asylum. There are altogether 41 hospitals, benevolent institutions, and asylums.

Finances and Banking.—The condition of the national banks of P. on 1902, Sept. 15, was as follows: loans and discounts $109,958,829; capital stock $18,722,520; surplus and other profits $43,090,020; circulation outstanding $6,743,097; undivided profits $43,090,020. In addition to the national banks there are state and private banks. The clearing house exchanges aggregated

(1900) $1,189,590,102, a gain of $87,[illegible]8,060 over the preceding year. In all the great manufacturing industries which have created P., recent growth has been healthy and business unusually prosperous. The P. parks comprise abt. 700 acres, those on the n. side 300 acres. Schenley Park, in Bellefield, contains the Phipps Conservatory, one of the finest in the United States.

History.—P. was originally Fort Duquesne (1754, Apr.—1758, Nov. 25), the centre of French efforts to hold the northwest: 1759, Jan., became Fort Pitt, and from 1764 was a frontier town and centre of trade with the Indians. The lands of the vicinity were surveyed first for the heirs of William Penn 1769, and designated (5,766 acres) the Manor of Pittsburgh. It was abandoned as a post by the British 1772, Oct.; a contest to include it within the bounds of Va. was decided in favor of Penn. 1779, Aug. 31; it was incorporated as a village 1794, Apr. 22; as a city 1816, Mar. 18. The first paper-mill was built 1798, first cotton-mill 1805, first glass-house 1807; rolling-mills and foundries date from the close of the war of 1812 with England; the first bank was started, and the first nail-machine was at work 1814; the rivers were first bridged 1816; destructive floods occurred 1832 and 52; and 1845, Apr. 10, 56 acres of the business centre was burned. From 1872 P. was enlarged by annexation of eleven boroughs across the Monongahela river. Allegheny City, across the Allegheny river, is commercially and socially one with P., although municipally distinct. Notable incidents of the history of P. have been the enormous production during the civil war of shot, shell, cannon, armor plates, wagons, gun carriages, harness, infantry and cavalry accoutrements, clothing, etc., etc.; and the strike-riots of 1877, July and Aug., when fighting took place, with the killing of about 25 men and the wounding of many more; extensive pillage, destruction of railroad buildings and of 2,000 freight cars, entailing a loss to the railroads of $8,000;000 to $10,000,000. Col. George Washington was at the forks of the Ohio in the wilderness 1753, Nov. 24; again, 1758, Nov. 25, he took possession of Fort Duquesne, which was changed to Fort Pitt at an expense of £60,000; and later, 1770, Oct. 18, he saw 'the town'—about 20 log-houses of Indian traders.

Government.—The city govts. of both P. and Allegheny are composed of mayor, controller, treasurer, and select and common councils, all elected by the people; and of administrative officials for depts. of police, fire, assessments, and public works. The central board and ward boards of education, in charge of the school system, are elected by popular vote.

P. has an estimated total valuation of real and personal property (1902) of $321,696,550, with city debt, in large part for the water-works, of $10,558,3[illegible]; tax rate $1.70. The growth of P. in number and value of new buildings for ten years was:

1881	539	$1,115,237
1882	1,442	1,935,530
1883	1,690	2,825,040
1884	1,846	3,261,960
1885	1,379	2,888,471
1886	1,413	2,282,254
1887	1,919	3,915,070
1888	2,764	5,341,193
1889	3,265	6,845,622
1890	3,174	7,079,567

The buildings erected (1890) were 40 iron-clad, 18 stone, 10 iron, 1,036 brick, and 2,070 frame. The city govt. appropriations 1890 were $4,045,475; estimates for 1891 aggregate $4,589,256, comprising public works $1,742,-739; public safety $688,366; charities $90,000, interest account, sinking funds, outstanding warrants, salaries, etc., $1,583,400; education $414,750; and judgments $70,000.

The water-works of P. date from 1824, when a supply was taken from the Allegheny river about a mile from its mouth by pumping to a reservoir of 7,500,000 galls. capacity, and thence to a high service basin of 3,000,000 galls. capacity. New works nine m. farther up the Allegheny were constructed half a century later, at a cost of about $5,000,000, with four pumping-engines of the largest horizontal type, forcing water through a 50-inch main into a reservoir 365 ft. high and of 117,651,000 galls. capacity, from which, for high service, a pumping-engine of 1,500,000 galls. daily capacity raises water into a second reservoir 275 ft. high and of 10,000,000 galls. capacity. For service to the city 113 m. of distribution mains were required, with cast-iron pipes of 4 to 30 inches diameter. These works are city property. For the s. side the Monongahela Water Co. provided 1864 works at the foot of 30th st. The ice-supply comes from the Pine Creek valley field, where for 16 m. ponds occur, the crop from which is got by 12 firms, each of a capacity of 5,000 to 20,000 tons. For 1890 the crop was 3,000 to 5,000 tons; but for 1891 there promises to be 100,000 to 125,000 tons.

Before natural gas came, five gas companies supplied the city at 75 cts. a thousand feet, and the people at $1. Natural gas was at 10 cts. per 1,000 ft. for prompt cash, when the rise took place 1890, Oct. 29, to 15 cts. cash, or 20 cts. otherwise. The East End Electric Light Co., capital $500,000, had a business for 1890 showing gross earnings $88,344, net profits $40,723. This, and the Allegheny County Light Company, supply lights for the city at $100 per year for each lamp.

For rapid transit P. has the best system of any city in the U. S. With Allegheny included there are 1890, June, 49 m. of street railway double track, and nearly 19 of single, with 34½ m. using horse-power, 20½ electricity, and 13 cable. There are nine street railway companies, with total capitalization of $17,800,000, and authorized bond issue of $6,500,000. During 1890 three new roads were completed and put into operation.

With the opening (1891, Feb. 9) of engine-house No. 17, large improvements in the fire bureau are completed, assuring as complete protection as can be secured by engine-houses and apparatus. The dept. of public safety consists of a police force of 290 men, with a chief supt., asst. supt., and inspector; salaries $278,500; total expenses $336,000.

Pop. (1793) 1,139; (1796) 1,395; (1810) 4,968; (1820) 7,248; (1830) 12,452; (1840) 21,115; (1850) 36,601; (1860) 49,221; (1870) 86,076; (1880, with eleven suburbs taken in 1872) 156,389; (1890) 238,473; to which Allegheny City adds 106,967; total 345,440; (1900) 321,616.

PITTSBURGH LANDING, BATTLE OF: see SHILOH, BATTLE OF.

PITTS'FIELD: city; cap. of Berkshire co., in w. Mass.; lat. 42° 36′ n., long. 73° 15′ w.; on the Boston and Albany r.r., 50 m. e. from Albany, 53 w. from Springfield, 151 w. from Boston; at the junction of the P. and N. Adams with the Housatonic r.r. The site of P. originally formed part of the Indian domain of Pontoosuc, and 1735 was granted to Boston, and known as Boston Plantation until its incorporation as a town 1761, with the name P., in honor of the elder Pitt, Earl of Chatham. P. is beautifully situated on a plain between the Hoosac hills on the e. and the Taconic on the w.; 1,000 to 1,200 ft. above sea-level, among lakes and ponds whose outlets form the two head branches of the Housatonic, one on the e. of P., the other on the w., with junction on the s. The town was built around a green, or small park, with houses mostly of wood, streets regularly laid out, and adorned with fine trees. There are fine public buildings, such as court-house of white marble, Congl. church of stone (as rebuilt 1853), St. Stephen's Episc. Church, Berkshire Athenæum building, and Berkshire Life Insurance Co.'s building, on the sides of the green; and, on the main street, the Rom. Cath. Chh. of St. Joseph in marble, and the fine grounds and buildings of the Maplewood Institute for young ladies. A handsome soldiers' monument was built 1872 on the green. In the e. part of P. is a larger park and race-course. P. is noted specially as a place of pleasant and healthful residence, and summer resort; but is also of considerable railway importance, and a seat of the manufacture of cotton and woolen goods, knit goods, silk, paper, tacks, machinery, shoes, etc. It has a large free library, a high-school, more than 30 public schools, 10 churches well supported, 3 banks and a large savings bank; a daily evening paper, two weekly papers, and a musical monthly. Its water-supply from Lake Ashley, on the top of the Washington hills, 7 m. s.e., is pure and abundant. There are gas and electric lights, and an electric street railway. Pop. (1860) 8,045; (1870) 11,132; (1880) 13,364; (1890) 17,252; (1900) 21,766.

PITTSTON, *pĭts'ton:* borough, Luzerne co., Penn., on the Delaware Lackawanna and Western, the Lehigh Valley, and the Delaware and Hudson Canal Company's railroads, and on the Susquehanna river; nine m. n.e. from Wilkesbarre, 9 m. s.w. from Scranton, and is near the centre of the Wyoming coal region. There are 18 churches; several graded schools; one monthly, two weekly, and two daily newspapers; and two state banks (combined capital $135,000), and a national bank (cap. $250,000). There are foundries, and a few mills, but the principal business is coal-mining. There are water-works, gas-works, an electric light plant, and a public park. P. was settled 1770, incorporated 1852. Pop. (1880) 7,472; (1890) 10,302; (1900) 12,556.

PITUITARY, a. *pĭ-tū'ĭ-tėr-ĭ* [L. *pitŭīta*, phlegm—from Gr. *ptūō*, I spit: It. *pituita;* F. *pituite*, phlegm]: that secretes or conveys phlegm or mucus. PITUITE, n. *pĭt'ū-īt*, phlegm or mucus. PITUITOUS, a. *pĭ-tū'ĭ-tŭs*, consisting of mucus or resembling it. PITUITARY GLAND or BODY, small reddish-gray mass of oval form, weighing six to ten grains, and situated on the sella turcica of the sphenoid bone, on the floor of the cavity of the skull. It is very vascular, and in its structure it resembles the ductless glands. In the fetus it is relatively larger than in the adult, and contains a cavity which subsequently disappears. It derives its name from having been supposedto secrete the fluid now known to be yielded by the Schneiderian or pituitary membrane of the nostrils. Its function is not known. PITUITARY MEMBRANE, the fine membrane lining the nostrils.

PITY, n. *pĭt'ĭ* [F. *pitié;* It. *pieta*, pity, compassion—from L. *pĭĕtātem*, piety, compassion—from *pĭus*, devout, pious]: compassion or sorrow excited by the distress or sufferings of another; fellow suffering or feeling; compassion accompanied with some act of charity; sympathy; a thing to be regretted; a thing to be looked upon as a misfortune, as, 'the more is the *pity';* used in the plu., as 'it is a thousand PITIES, *pĭt'ĭz'*—that is, it is a thing to be very much regretted: V. to feel pain or grief for one in distress; to compassionate; to be compassionate; to be affected with pity. PIT'YING, imp. *-ĭ-ĭng:* ADJ. showing pity; compassionate. PIT'IED, pp. *-ĭd.* PIT'IER, n. *-ĭ-ér*, one who pities. PIT'IABLE, a. *-ă-bl* [F. *pitoyable*, compassionate]: deserving pity; lamentable; mournful. PIT'IABLY, ad. *-blĭ.* PIT'IABLENESS, n. *-bl-nĕs*, state of being pitiable; state of deserving compassion. PIT'IFUL, a. *-fûl*, in *Scrip.*, tender; moving compassion; generally used in an ill sense, contemptible; paltry; insignificant. PIT'IFULLY, ad. *-lĭ.* PIT'IFULNESS, n. *-nĕs*, the state of being pitiful. PIT'ILESS, a. *-lĕs*, wanting pity; hard-hearted; cruel; merciless. PIT'ILESSLY, ad. *-lĭ.* PIT'ILESSNESS, n. *-nĕs*, the state of being pitiless. PIT'YINGLY, ad. *-lĭ*, in a pitying manner; sympathizingly.—SYN. of 'pitiable': wretched; miserable; mournful; woful; rueful; sorrowful; affecting; lamentable; doleful;—of 'pitiful': despicable; contemptible; paltry; tender; compassionate; miserable;—of 'pitiless': merciless; cruel; unmerciful; hard-hearted; compassionless;—of 'pity, n.': mercy; clemency; leniency; compassion; commiseration; condolence; sympathy; fellow-feeling.

PITYRIASIS, n. *pĭt'ĭ-rī'ă-sĭs* [Gr.—from *pitu'ra*, scurf or bran]: one of the squamous or scaly diseases of the skin, in which there is a continual throwing off of bran-like scales of epidermis, which are renewed as fast as they are lost. It may occur on any part of the body, giving rise to brown patches, in which are sensations of itching, tingling, or pricking. It is more easily cured than the other scaly diseases, and its removal can generally be effected by frequent use of the warm bath; or, if that fails, recourse may be had to alkaline or sulphur baths; due attention being at the same time given to the general health. It sometimes occurs on the scalp, when it is known as *dandruff*, and must be treated with weak alkaline lotions; or, if these fail, with tar ointment if there is no inflammation. There is a variety known as *P. versicolor*, due probably to a parasitic fungus, the *Microsporon furfurans;* though it is not known whether the fungus is the cause of the disease, or only an attendant on it, finding a suitable *nidus* in the diseased epidermis. This variety may be detected by microscopic examination of the exfoliated scales, when the spores and filaments of the fungus will be shown. The treatment must be solely local. Dr. Watson mentions a case which yielded at once to two sulphur baths. Probably the best remedy is the application of a saturated watery solution of sulphurous acid gas, or of one of the sulphites dissolved in diluted vinegar. PIT'YROID, a. *-royd* [Gr. *eidos*, resemblance]: bran-like.

PIÙ, ad. *pī-ô'* [It.; L. *plus*, more]: in *music*, a word prefixed to another in order to indicate an increase to its significance; a little; more, as *più allegro*, a little quicker.

PIUMA, n. *pĭ-ū'ma* [etym. doubtful]: mixed fabric of light texture used for men's coats.

PIURA, *pē-ô'râ:* city, cap. of the province of P. in Peru, and on the river P., 523 m. n.w. from Lima. It is one of the most important places in n. Peru, and has considerable trade. The rainfall is limited, but the soil is fertile; and in the surrounding region sugar-cane, cotton, and tobacco are produced, and the live stock industry is considerably developed. Iron, lead, and other minerals abound, and there are large quantities of petroleum. The principal manufactures are leather and soap. P. was founded 1531 by Pizarro, and was the first place in Peru settled by Europeans. It was formerly called San Miguel, and is now sometimes referred to as San Miguel de Piura. The province has nearly 14,000 sq. m. Pop. of city about 15,000.

PIUS, *pī ŭs*, **I.**, SAINT: Bishop of Rome: dates of birth and death not known (bp. of Rome 158–167); said to have been born in Aquileia, to have been son of Rufinus, and to have died a martyr. His history is largely conjectural. But all this, including the above dates, is doubtful. He is on record as an opponent of such heresies as those of Marcion and Valentinus, and to him is attributed the observance of the festival of the resurrection on Sunday. He has been cannonized as a martyr, his day being July 11, Certain letters under his name are considered unauthentic.

PIUS II. (originally known as ÆNEAS SYLVIUS): Pope of Rome: 1405–64, Aug. 14 (reigned 1458–64); b. Corsignano, in the duchy of Siena; of the noble family of Piccolomini. His early life was not free from serious irregularities, but he made amends by subsequent decorous conduct; and his eminent abilities as a canonist led to his employment, when but 26 years of age, as sec. of the Cardinal of Fermo, in a post of the highest confidence at the Council of Basel (q.v.). He was intrusted by that council—whose views in its conflict with the pope he fully shared—in several commissions of great importance; and on the election of the antipope, Felix V., Æneas Sylvius was chosen as his secretary. But having been sent by him as ambassador to Emperor Frederick III., he was induced to accept office in the imperial court, and served the emperor on several embassies and other important missions. In the difficulties between Frederick and Pope Eugenius IV., after the council of Florence, Æneas conducted so skilfully a negotiation with which he was intrusted, that the pope retained him as sec. in his court. His views of church matters having undergone considerable change, he continued in favor under the successor of Eugenius, Nicholas V., 1447; and under Callistus III. he was elevated to the cardinalate. On the death of Callistus 1458, he was elected pope, and took the name Pius II. His pontificate was embarrassed by contests on German affairs, but it is rendered memorable chiefly by the sustained efforts which P.—first in this policy of a long line of pontiffs, to whom the public security of Europe owes deep obligation—made to organize an armed confederation of Christian princes to resist the progress of the Turkish arms: this organization, however, for a long time had no considerable results. The literary reputation of the scholar, Æneas Sylvius, has partially eclipsed the historical fame of the Pope Pius. He was one of the most eminent scholars of his age. His works were published at Basel (1 vol. fol. 1551), but many of his works are not included in that edition. They consist chiefly of histories, or historical dissertations and materials of history; but the most interesting portion of his collected works are his letters, very numerous, and full of details characteristic of the writer and of the age. The same may be said of a biographical commentary, which is in truth an autobiography, written chiefly from his own dictation, by his secretary, John Gobellinus; pub. Frankfort 1614. See Voight's *Life of Pius* (Berl. 1856).

PIUS IV. (GIOVANNI ANGELO MEDICI): Pope of Rome: 1499, Mar. 31—1565, Dec. 9 (reigned 1560–65); b. Milan; uncle of St. Carlo Borromeo. He is notable from his connection with the famous creed known under his name. His pontificate is memorable chiefly as that in which the protracted deliberations of the council of Trent (q.v.) were brought tc a close. P. had the duty, 1563, Dec., of issuing the bull confirmatory of its decrees. The well-known Creed of Pius IV., called sometimes the Tridentine Creed, was issued by P. as an embodiment of all the doctrines defined in that council.

PIUS V., SAINT (originally named MICHELE GHISLERI): Pope of Rome: 1504–1572, May (reigned 1566–72); b. in the village of Bosco, near Alessandria; of poor parents. At the age of 14, he entered the Dominican order. His eminent merits were recognized by Paul IV., who named him Bp. of Satri, 1556, and cardinal 1557. Of austere habits, he carried into his administration the same rigor which distinguished his personal conduct; and when appointed inquisitor-gen. for Lombardy, he employed the most rigorous measures in repressing the Reformation, which had begun to effect an entrance. He was afterward translated to the see of Mondovi; and immediately after the death of Pius IV., he was chosen unanimously as his successor. P. carried into his pontifical life the same personal austerity and administrative rigor which he had evinced as bishop. Applying to others the same rules which he enforced on himself, he enacted severe laws for regulation of public morals, prohibiting bull-fights, suppressing prostitution, and proscribing a variety of popular but demoralizing exhibitions. The Roman Inquisition, too, under his government exercised a severity equalled in no other pontificate. He endeavored to enforce everywhere the disciplinary decrees of the Council of Trent; and the whole spirit of his pontificate is strikingly exhibited in the decree by which he ordered the yearly publication of the celebrated bull, *In Cœna Domini* (q.v.). It was an application to the 16th c. of the principles and legislation of the Hildebrandine epoch. But the most momentous event of the pontificate of P. was the expedition which he organized, with Spain and Venice, against the Turks, and which resulted in the great naval engagement of the Gulf of Lepanto, 1571, Oct. 7. He was canonized by Clement XI. 1712.

PIUS VI. (originally named ANGELO BRASCHI), Pope of Rome: 1717, Dec. 27—1799, Aug. (reigned 1775–99); b. Cesena. He was selected by Benedict XIV. as his sec.; and under Clement XIII. he was named to several important appointments, which led finally, under Clement XIV., to his elevation to the cardinalate. On the death of Clement XIV., Cardinal Braschi was chosen to succeed him. The conflict with the civil power in the various states of Europe, in which, from the days of Innocent XI., the Roman see had been in some degree almost unceasingly involved, assumed under P. its complete and scientific development. His relations to Emperor Joseph of Austria and the Grand-Duke Leopold of Tuscany, who persisted in reformation of the religious orders, etc., were far from amicable. The internal administration of P., however, was enlightened and judicious. To him, Rome owes the drainage of the Pontine Marsh, the improvement of the port of Ancona, the completion of the church of St. Peter's, the foundation of the new Museum of the Vatican, and the general improvement and embellishment of the city. These and similar projects were interrupted by the outbreak of the French Revolution. In 1793 a popular tumult at Rome, caused by the imprudence of a French political agent named De Basseville, and which resulted in his death, gave the French directory an opportunity of hostile demonstrations against the pope. In 1796 Bonaparte took possession of the Legations, and afterward of the March of Ancona, and by a threatened advance on Rome, extorted from P., in the Treaty of Tolentino, the surrender of these provinces to the Cisalpine Republic, together with a heavy war contribution. The year 1797 was marked by a continuance of the same vexatious measures; and at length the directory ordered the invasion of Rome; Berthier entered the city, 1798, Feb. 10, and took possession of the castle of San Angelo. P. was required to renounce his temporal sovereignty; and on his refusal, was seized, Feb. 20, and carried away to Siena, and afterward to the celebrated Certosa, or Carthusian monastery, of Florence. On the threatened advance of the Austro-Russian army in the following year, he was transferred to Grenoble, and finally to Valence on the Rhone, where, worn out by age and by the rigor of confinement, he died in the 82d year of his age and the 24th of his pontificate.

PIUS VII. (originally GREGORY BARNABAS CHIARAMONTE), Pope of Rome: 1742–1823, Aug. 20 (reigned 1800–23); b. Cesena. He entered the Benedictine order at an early age, and was employed in teaching philosophy and theology at Parma, and at Rome. He was appointed Bp. of Tivoli; was then made cardinal, and translated to the see of Imola. After the death of Pius VI., Cardinal Chiaramonte was chosen his successor, 1800, Mar. 14. Rome, which till this time had been in the occupation of the French, was restored to the papal authority; and in July, P. VII. entered into his capital; and in the following year the French troops were definitively withdrawn from the papal territory with the exception of the Legations. From this time, P., ably seconded by his sec. of state, Cardinal Consalvi, occupied a prominent place in the political as well as the ecclesiastical affairs of Europe. Bonaparte had resolved to restore religion in France on the ancient basis of connection with Rome. With this view, he entered into negotiations with P. VII. for establishment of a concordat suited to the new order of things. These negotiations were conducted at Paris, and were attended with many difficulties and delays, until at length Cardinal Consalvi repaired in person to the conference, and, by his energy and decision, disentangled the complicated embarrassments in which it was involved. The con cordat was agreed to at Paris, 1801, July 15, ratified in Rome, Aug. 14; and published in Notre Dame 1802 on Easter Sunday. But simultaneously with it, and as if part of the same arrangement, was published a code of what were called 'Organic Laws,' seriously affecting the discipline of the church on marriage, on the clergy, and on public worship, which had never been submitted to P., and to which he not only had not consented, but to which he found himself compelled to offer every opposition. For the first year which succeeded the publication of the concordat, no occasion of difficulty arose; but conflict of principles was in the end inevitable. In 1804 Bonaparte having resolved on assuming the imperial crown, invited P. to come to Paris for the purpose of crowning him, and the pope, though with much hesitation, consented. He took advantage of his visit to demand the recall or modification of the articles, but without success; and though, during his visit to Paris, he was treated with great distinction and reverence, his relations with Napoleon from that date began to be less friendly. The French emperor proceeded from one petty outrage to another, until finally, 1808, Feb., the French troops, under Gen. Miollis, entered Rome, and took possession of the castle of San Angelo; and Apr. 2 a decree was issued annexing the provinces of Ancona, Fermo, Urbino, and Macerata to the kingdom of Italy. P., besides protesting against the usurpation, declared himself a prisoner in the French hands, and confined himself to his palace. The papers of the cardinal sec. were violently seized, and the pope was compelled to appoint a pro-secretary; and finally 1809, May 17, the usurpation was consummated by a decree annexing Rome and all the remaining papal territory to the French empire. This was the signal for the pope abandoning his lengthened policy of forbearance: June 10, P. issued a bull of excommunication, directed (without naming Napoleon) against the perpetrators and abettors of the invasion of the rights and the territory of the holy see. Soon afterward the French gen. ordered the removal of the pope from Rome; and P., without offering any resistance, but declaring that he yielded to force, was removed, first to Florence, then to Grenoble, thence for a longer time to Savona, whence, 1812, June, he was finally transferred to Fontainebleau. During this prolonged captivity, P. firmly but quietly resisted every effort to compel or seduce him from his policy. At Fontainebleau he was treated with much external respect; and on Napoleon's return from the Russian campaign, 1812, Dec., orders were given that the cardinals, with some exceptions, should be admitted to the presence of the pope. Under much pressure, both from the emperor himself—who is alleged by some to have acted with great rudeness, and even with personal violence—and from the ecclesiastics to whom the emperor confided his plans, P. was induced to sign a new concordat, an important provision of which was the recognition of the annexation of the Roman states to the empire. Having obtained the concession, Napoleon at once permitted the absent cardinals to return, and of these many remonstrated so earnestly against the concordat, that, March 24, P. wrote to revoke his consent. Napoleon took no notice of the revocation; nor was it till after the disasters of 1813 that he began to seek an accommodation. P. refused to treat until he should be restored to Rome; and 1814, Jan. 22, orders were sent for his immediate return to his capital. Unattended by his cardinals, he was escorted to Italy, and remained at Cesena until the fatal campaign of the spring of 1814 placed Paris in the hands of the allies, when P. re-entered Rome amid the gratulations of the people, 1814, May 24—a day since held sacred in the Roman calendar. During the Hundred Days, he was again compelled to leave Rome; but after the campaign of Waterloo, he finally resumed possession, which was undisturbed for the rest of his life, and which extended to the whole of the ancient territory, including the Legations.

The last years of his pontificate were given to internal administration; and under the enlightened govt. of Cardinal Consalvi, were marked by wisdom and moderation. But the administration chiefly by ecclesiastics, and the secrecy of law procedure were resumed. P. repressed, too, with great vigor the disorder and brigandage which the long wars had introduced, and a whole village of notorious and incorrigible criminality, Somma, was razed to the ground 1819. He was equally vigorous in repressing secret societies, especially that of the Carbonari (q.v.). The ecclesiastical measures of his later period also were important. In 1814 he formally restored the suppressed order of the Jesuits (q.v.). In 1817 and the following years, he concluded concordats with Naples, with Prussia, Würtemberg, and other courts of Germany. In this and every other period of his life, P. was a model of gentleness, simplicity, benevolence, and Christian charity. 1823, July, having reached the patriarchal age of 81, he fell accidentally and broke his thigh. He sank gradually, and died in the following month.

PIUS IX. (GIOVANNI MARIA MASTAI FERRETTI), Pope of Rome: 1792, May 13—1878, Feb. 7 (reigned 1846–78); b. Sinigaglia. His pontificate was during one of the most eventful periods in the history of the papacy. He was intended originally for the military profession—the Noble Guard; but symptoms of an epileptic tendency changed his plans. He received holy orders, and after exercising his ministry in Rome, was sent as 'auditor' of the vicar-apostolic to Chili. Having been successively abp. of Spoleto and of Imola, nuncio, and cardinal, he was, on the death of Gregory XVI. elected 'by acclamation' to succeed him. He took the name Pius IX., and entered at once on a course of reforms, by which he hoped to establish the papal govt. on a popular yet firm basis. He resolved to extirpate all abuses of administration, to withdraw the restrictions of personal liberty, to secularize the local administration, and to extend the rights of self-government. His first step was to grant an amnesty; and this measure, however humane and necessary, had the result of drawing together into the Roman states a body of men whom an unhappy experience of exile had embittered against the existing order. For a time, the reforming policy of P. carried with it the affections of the people; but he soon fell short of the expectations which he had created. The outbreak of the French revolution of 1848, Feb., precipitated the crisis of popular discontent. In Nov. of that year Count Rossi, whom the pope had appointed his minister, was assassinated; and violent demonstrations were daily employed to compel the pope's assent to measures which he repudiated. Having at first confined himself to the Quirinal, he at length fled secretly from Rome to Gaeta, a Neapolitan seaport near the Roman frontier. A republic was proclaimed in Rome, the provisional heads of which proceeded to a complete and radical remodelling of the civil govt. of the state. P. from his exile addressed a remonstrance to the various sovereigns. 1849, Apr., a French expedition was sent to Civita Vecchia, which eventually advanced on Rome, and, after a siege of about 30 days, took possession of the city, and established a French army of occupation within the Roman state. The pope's govt. was re-established, but he did not return till 1850, when he again entered on the administration. In consequence of the unsettled condition of Italy and the failure of many of his early measures of improvement, he declared himself unable to proceed with the reformations which he had contemplated. After that time, his authority was maintained without interruption; but the discontent continued. After the war for the unification of Italy, the Legations, Ancona, and a considerable part of the papal territory southward in the direction of Rome, were annexed to the kingdom of Italy; but P. persistently refused to cede any portion or to enter into any compromise. His ecclesiastical administration continued very active, and proceeded on the strongest assumption of the right of independent action on the part of the church. In this view he re-established the hierarchy in England, he sanctioned the establishment in Ireland of a Rom. Cath. university, and condemned the principles on which the queen's colleges in that country were constituted. He concluded with Austria a concordat much more favorable to church authority than the existing ecclesiastical laws had permitted: see CONCORDAT. In 1854 he issued a decree propounding as a doctrine of the church the faith of the Immaculate Conception of the Blessed Virgin Mary (q.v.). In the internal administration of his states, notwithstanding the embarrassed condition of finances produced by the curtailment of his territory, he introduced many ameliorations, and did much for improvement of the city of Rome and of its institutions. In this he was aided by the voluntary contributions of the several churches, as well in special gifts as in the organization of the permanent tribute called Peter's Pence (q.v.). In 1864, on occasion of the centenary of the martyrdom of St. Peter, he brought together at Rome a large assemblage of bishops, and subsequently, on occasion of the canonization of the Jesuit martyrs of Japan.

But the most important event of his pontificate was the convocation of the Vatican Council (see COUNCIL), at which bishops from all parts of the Rom. Cath. world assembled 1869, Dec.: for its discussions see POPE. It was adjourned 1870, July, after it had proclaimed the famous decree of the infallibility of the pope, when on a subject of faith or morals he issues a decree *ex cathedrâ* to the universal church. Soon after the adjournment, the Italian army occupied Rome, and declared it the capital of the kingdom of Italy. P. renewed with all solemnity his oft-repeated protest, and refusing an offered dotation, and all other proposals of accommodation, from that date declared himself a captive in the Vatican, to which he strictly confined himself. 1871, June, he completed the 25th year of his pontificate, thus exceeding the term of all previous pontificates except that assigned to St. Peter, and falsifying in his own person the traditional prediction that no pontiff would ever 'see the days of Peter.' His health was for some years precarious; but with occasional interruptions, he continued to attend personally to all public affairs, civil as well as ecclesiastical, of his office.

PIUS X. (GUISUPPE SARTO), Pope of Rome; 1835, June 2 ——; b. in Riese, diocese of Treviso, province of Venice, Italy, of humble origin. He was educated in the Salesian Institute, Cottolengo, and at Padua, and gained the favor of his instructors by his studiousness. On 1858, Sept. 18, he began the work of a parish priest; in 1875 was elected episcopal chancellor; subsequently became spiritual director of the seminary, pro-synodal examiner, member of the ecclesiastical tribunal, and finally vicar of the chapter of Treviso. On 1884, Nov. 10, he was made bishop of Mantua, and on 1893, June 12, cardinal and patriarch of Venice, and titular of the church of St. Bernardo alle Terme in Rome. His preferment was opposed by the Italian government on the ground that the patriarchate was part of the king's patronage. The Vatican denied this claim, and the dispute was ended by virtue of Sarto's personality, for he was on the most friendly terms with the king and queen, and from the latter had accepted special marks of favor. At a later date the patriarch displayed independence by attending a reception at the Quirinal, contrary to the expressed desire of Leo XIII. As cardinal he increased the reputation he already had for piety, learning, and administrative ability. He reformed abuses in the administration of the churches; insisted on the strict observance by the priests of liturgical rules; destroyed relics whose authenticity was doubtful, and therefore was misleading; and patronized the arts liberally, especially music, reviving the Gregorian chant in St. Mark's. He was ranged among the more liberal members of the Italian episcopate, and showed a conciliatory spirit by advocating a union of church and state. Occupied wholly with the duties of his diocese, he seldom visited Rome, and held himself aloof from the projects and intrigues of the Curia. He is said to have been referred to by Leo XIII. as his probable successor, but during the early ballotting in the college of cardinals, 1903, his name was not prominent, Cardinals Rampolla and Vanutelli being the leading candidates, the latter being preferred at the Quirinal. Finally brought forward as a compromise candidate, Sarto was elected pope on the sixth ballot, Aug. 4. The choice was reached by the union of two currents of opinion in the sacred conclave, the one constant in its resistance to the encroachments of the temporal power, the kingdom of Italy, the other seeking some *modus vivendi* by which terms could be arrived at and more amicable understandings had between the Holy See and the State. Sarto's election gave great satisfaction to Austria, which had not favored Rampolla on account of his opposition to the Triple Alliance, and was equally acceptable to Germany and France. Among the first of those of many countries to convey the homage of the nations was a party of American pilgrims. Pius X. was crowned in St. Peter's on Sunday, Aug. 9, with the most impressive ceremonies of the church, these being the first of their kind observed in the edifice since 1846.

PIVOT, n. *pĭv′ŏt* [F. *pivot,* the peg on which a door turns: It. *pivolo,* a peg: mid. L. *pipa,* a pipe: the word has the same derivation as *pipe,* which see]: the point of the pin or axle on which a wheel or body turns; the end of a shaft which rests and turns in a support; a turning-point; the stationary officer or soldier on whom as marking the centre the wheelings are made in the various evolutions: V. to place on a pivot. Piv′oting, imp. Piv′oted, pp.: Adj. furnished with pivots. Pivot-gun, a piece of ordnance which turns on a pivot in any direction.

PIX, n., or Pyx, n. *pĭks* [L. *pyxis,* a box: Gr. *puxis,* a box; *puxos,* L. *buxus,* box-tree—so called from the density of the wood, Gr. *puknos,* dense]: the box containing the coins selected to be tried by the assay-master in order to prove that they are of the standard purity—the process is called Pixing, n. *pĭks′ĭng;* in the *Rom. Cath. Chh.,* the little box or chest in which the consecrated wafer or host is kept.

PIYÂDASI: one of the names often in inscriptions, of the celebrated King As′oka: see Buddhism: India.

PIZARRO, *pē-zăr′rō,* Sp. *pe-thâr′ro,* Francisco: conqueror of Peru: 1476–1541, June 26; b. Truxillo, Estremadura, Spain; illegitimate son of Gonzalo P., a col. of infantry and a soldier of some distinction. Of his youth, little is known, but it appears that he was wholly neglected by his parents, was taught neither to read nor write, and that his principal occupation was that of a swineherd. Abandoning this uncongenial employment, he sought the port of Seville, and there embarked, to seek fortune in the new world. He was in Hispaniola 1510; later, he joined Balboa, and was with that cavalier when he crossed the Isthmus of Panama and discovered the Pacific. In 1515 he was engaged in traffic with the natives on the shores of the newly-discovered ocean, but was afterward chiefly in military service, in which he showed great bravery, resource, and endurance. About this time, when a fresh and powerful impulse was given to adventure by the splendid achievement of Cortes, rumors of a country far south, in which gold and silver were said to be as abundant as iron in Spain, reached Panama, and kindled P.'s ambition. He formed a sort of copartnery with Diego de Almagro, an adventurer and foundling like himself, and Hernando Luque, an ecclesiastic; and with the funds which the three friends amassed, they were enabled to fit out a small expedition, of which P. took command. 1524, Nov., he set sail southward, but went no further than Quemada Point. Making an agreement (dated 1526, Mar. 10) that all lands, treasures, vassals, etc., that should be discovered were to be equally divided between them, the three friends, P., Almagro, and Luque, organized a second expedition, consisting of two ships, which set sail for the South Seas. Having reached the port of Santa, lat. about 9° s., and having really discovered Peru, P. returned to Panama, carrying with him many beautiful and valuable ornaments in gold and silver, which he had obtained from the friendly and generous natives, as well as specimens of woolen cloths of silky texture and brilliant hue, and some lamas or alpacas. Unable to find in Panama a sufficient number of volunteers for invasion of the newly-discovered country, the indomitable adventurer returned to Spain 1528, narrated the story of his discoveries before Charles V. and his ministers, described the wealth of the territories, and showed, as proof, the gold ornaments and utensils, the manufactures, etc., which he had brought. The result of his representations was, that the right of the discovery and conquest of Peru was secured to him, and honorable titles —among others those of gov. and capt.-gen. of Peru—were conferred on him. On his side, he agreed to raise a certain number of followers, and to send to the crown of Spain a fifth of all the treasures that he should obtain. Returning to Panama, he set sail for Peru for the third and last time, with a well-equipped but small force, not more than 180 men, of whom 27 were cavalry. For the chief events of the conquest of Peru, see PERU: also ALMAGRO: ATAHUALPA. Within ten years, the great *conquistador* made the empire of Peru his own; but he who had surmounted so many stupendous difficulties, who had broken through the lofty barrier of the Andes, and, with his group of followers, been a victor in so many fields, fell a victim to a conspiracy 1541.

P. was a soldier of unflinching courage, inflexible purpose, and unfailing resource; yet his success in Peru appears to have been the result of chance more than of calculation. His boldest stroke was the seizure of the Inca Atahualpa (q.v.), when surrounded by thousands of his followers; but in doing so he deserved credit neither for originality nor for policy; since the idea was borrowed from Cortes, and the step itself was so foolhardy and desperate, that its success can be regarded only as luck. Although on some occasions he appears to have been guided by noble and generous impulses, he was eminently selfish, perfidious, and relentless. His conquest of Peru is a drama in every act of which there is bloodshed; but the drama is at least consistent to the end. P. lived a life of violence, and died a violent and bloody death.

PIZAR'RO, GONZALO: 1506–1548, Apr. 10; b. Truxillo, Estremadura, Spain; illegitimate son of Col. Gonzalo P. He cast in his fortunes with those of his brother Francisco P. when that leader returned to Spain 1528. He became a soldier at an early age; distinguished himself, before he joined his brother's expedition, by his skill in martial exercises; and when he reached Peru, was esteemed the best lance in the Spanish troop. The territory of Quito was assigned to him by Francisco, and he was enjoined to undertake an exploring expedition to the east, where a land, reputed extremely rich in spices, was said to lie. At the head of 350 Spaniards and a great concourse of Indians, P. set out on his famous journey in the beginning of 1540. Marching e., they reached a country traversed by lofty branches of the Andes. Here the icy winds benumbed the limbs of the adventurers as they rose to the higher plateaux, and, rendered helpless by the cold, many of them sank and died. Descending the e. slopes of the Andes, they reached the 'Land of Cinnamon;' but as they could not transport the trees across the mountains, their discovery was almost valueless. Hearing of a land abounding in gold at the distance of ten days' journey, the leader resolved to reach it. Pushing forward, the Spaniards entered great forests, where often they had to hew a passage with their axes. Their clothes were now torn to shreds, and their provisions had been long exhausted. They killed and ate the dogs they had brought with them, after which they lived on the herbs and dangerous roots of the forest. At length they struck the broad and desolate waters of the Napo, important affluent of the Amazon. On the surface of this broad river no vessel floated, and its course was amid gloomy woods, whose silence was undisturbed except by the sound of the rushing waters. Here P. caused a rude bark to be constructed for transport of the baggage and of the weaker travellers. Francisco de Orellana was intrusted with the command of the vessel. P., hearing of a populous nation at the distance of a few days' journey, who dwelt near the confluence of the Napo with a larger river, sent forward Orellana to obtain and bring back supplies for the starving travellers, who had eaten the last of their horses, and were now reduced to the leather of their saddles and belts. Orellana reached the Amazon; but, unable either to obtain supplies, or to return against the current of the river, abandoned the expedition, and with his 50 followers resolved to sail down the Amazon, reach the Atlantic, and make for Spain. This wonderful design was successfully carried out. P., after waiting in vain for the return of the bark, resolved to return to Quito, which, after enduring terrible sufferings, and seeking fruitlessly for the rich regions of which he had heard so much, he reached 1542, June, after an absence of more than two years. The fatal character of this expedition may be inferred from the appearance the travellers presented on their return. Half of the 4,000 Indians had perished, and of the Spaniards, only 80 remained; and these, clad in skins, blackened by the sun, and wasted by hunger and fatigue, with long matted locks, seemed like a troop of spectral savages. This expedition stands unmatched in the annals of American discovery for its dangers and sufferings, for the length of their duration, and for the fortitude with which they were endured. For the fate of Gonzalo P., see PERU.

PIZZICATO, *pĭt-sĭ-kâ'tō* [Ital. twitched], abbreviated *Pizz.:* term of direction in music for the violin or violoncello, to denote that the strings, instead of being played as usual by the bow, are to be twitched with the fingers in the manner of a harp or guitar. The P. is much used in accompaniments, as sounds thus produced do not cover the voice; it is used also in symphonic effects. The ordinary mode of playing is restored by the letters *c. a.* (*col arco,* with the bow).

PIZZO, *pĭt'sō:* seaport of s. Italy, 24 m. w.s.w. of Catanzaro. At P., Murat (q.v.) was taken, tried, and shot. Pop. 7,400.

PLACABLE, a. *plā'kă-bl* or *plăk'ă-bl* [L. *placa'bĭlĭs,* easily appeased—from *plāco,* I quiet or soothe: It. *placabile*]: that may be appeased or pacified; willing to forgive; easily reconciled. PLA'CABLY, ad. *-blĭ.* PLA'CABIL'ITY, n. *-bĭl'ĭ-tĭ,* or PLA'CABLENESS, n. *-bl-nĕs,* the quality of being placable or appeasable.

PLACARD, n. *plăk'ârd* [F. *placard,* a bill posted up—from *plaquer,* to clap on; *plaque,* a plate of metal: Dut. *plakken,* to paste, to daub: Flem. *placke:* Scot. *plack*]: a bill or printed paper stuck up against a wall; a declaration fixed up in some public place; a posting-bill: V. *plă-kârd',* to stick up a written or printed paper on a public place; to cover with bills; to notify publicly. PLACARD'ING, imp. PLACARD'ED, pp.

PLACE, n. *plās* [F. *place*—from L. *platēa*, a street; Gr. *plateia*, a broad way: It. *piazza;* Ger. *platze;* Sp. *plaza*, a place, a market-place]: situation, site, or spot; a wide street or public square in a city; any portion of space; station or rank; a position occupied and held as a residence; a village, town, or city; occupation or calling; office; lieu or stead room; existence; duty; function; a passage of a writing; ordinal relation, as, in the first *place;* position; a fortified town or post; in *OE.*, the pitch of a hawk or other bird of prey: V. to set or fix; to appoint; to settle; to invest. PLAC'ING, imp. PLACED, pp. *plāst.* PLACER, n. *plās'ėr*, one who places or sets. PLACELESS, a. *plās'lĕs*, without a place; in *politics*, out of office. PLACE'MAN, n. *-măn*, one who holds office under a government; one who fills a public station. TO TAKE PLACE, to happen; to come to pass. TO TAKE THE PLACE OF, to be substituted for. TO GIVE PLACE, to make room or way; to yield precedence. TO HAVE PLACE, to have a station, room, or seat; to have existence. PLACE-BRICKS, the outermost bricks in a clamp or kiln, and only sufficiently burnt on one side. PLACE OF ARMS, in *mil.*, an enlargement of the covered-way, where bodies of troops can be formed to act either on the defensive, by flanking the covered-way, or on the offensive, by making sorties. HIGH PLACES, in *Scrip.*, an elevation or rising ground encompassed with trees where sacrifices were offered, generally to idols.—SYN. of 'place, n.': space; locality; location; room; passage; effect; existence; rank; priority; precedence; office; way; ground; station; situation; seat; abode; position; site; spot; employment; charge; trust; function.

PLACEBO, n. *plă-sē'bō* [L. I shall please]: a prescription given by a physician to please rather than to benefit the patient; in the *Rom. Cath. Chh.*, the vesper hymn for the dead.

PLACENTA, n. *plă-sĕn'tă* [L. *placenta*, a cake; Gr. *plakous*, a flat cake—from *plax*, a flat surface]: in *anat.*, the vascular outgrowth from the walls of the uterus, forming the principal medium of communication between the parent and child, and which, being expelled after the birth, is popularly called the *after-birth* (see below): in *bot.*, the part of the carpel bearing the ovules (see below). PLACEN'TAL, a. *-tăl*, pertaining to the placenta: N. a mammal having a placenta. PLACENTARY, a. *plă-sĕn'tėr-ĭ*, pertaining to the placenta; same as *placental:* N. in *bot.*, a placenta bearing numerous ovules. PLACENTATION, n. *plăs'ĕn-tā'shŭn*, in *bot.*, the manner in which the seeds are attached to the pericarp. PLAC'ENTIF'EROUS, a. *-tĭf'ėr-ŭs* [L. *fero*, I produce]: bearing or producing a placenta. PLACENTIFORM, a. *plă-sĕn'tĭ-fawrm* [L. *forma*, a shape]: cake-shaped.

PLACEN'TA, or AF'TER-BIRTH: temporary organ developed within the uterus during pregnancy, and, as its popular name implies, expelled from the maternal organism shortly after the birth of the child or young animal. It is a spongy vascular mass, existing in some form in all mammals, excepting the *Marsupialia* and *Monotremata*, as an appendage to the fœtal membrane called the *chorion*. In the human subject (fig. 1), it is of considerable size at the period of delivery, being of rounded or oval form, with diameter of 6 or 8 inches, and thickness of somewhat more than an inch. Its outer surface, which, till the period of its detachment and expulsion, is attached to the walls of the uterus, is uniform and level (unless it has been morbidly adherent), being covered by a membrane, shortly to be noticed, called the *decidua serotina;* and on peeling off this membrane, the various lobes of which the P. is composed are apparent. The internal or free surface is smooth and shining, and gives attachment to the umbilical cord or navel-string, which connects it with the fœtus. To render the mode of formation of the P. clear, we must premise that the impregnated ovum, when it reaches the uterus, is invested with an outer membrane, the *chorion*, which forms a shut sac, externally covered with short villi. As the ovum advances in age, these villi diminish in number, until few remain, except at that part of the chorion which is in contact with the uterus; and here, about the second month (in the human subject), they divide into branches, as shown in fig. 2. While these changes are going on in the membrane of the ovum, the uterus also is undergoing modification; and on the nature and extent of these uterine changes the character or type of the P. depends. There are two such types, the first of which is represented best by the human P., and the latter by that of the pig.

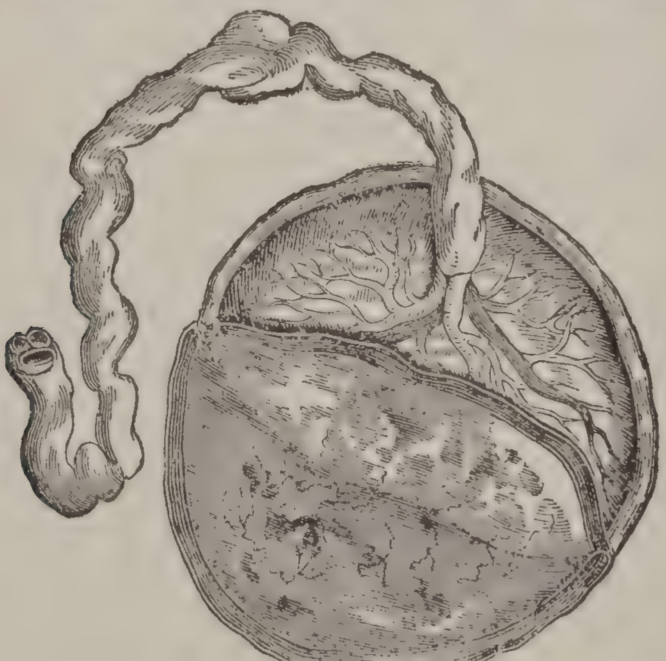


Fig. 1.—Human Placenta (half of it being split in two) and Umbilical Cord.

In animals exhibiting the first type of placental structure, the mucous membrane lining the uterus undergoes a rapid growth and modification of texture, becoming connected with the *membrana decidua*, so called from its being thrown off at each parturition. For brevity it is usually termed the *decidua*. This decidua is from an early period separable into three portions—the *decidua vera*, or *decidua uteri*, which lines the general cavity of the uterus; the *decidua reflexa*, which immediately invests the ovum; and the *decidua serotina*, which is merely a special development of a part of the decidua vera at the part where the villi of the chorion are becoming converted into the fœtal portion of the placenta. The arrangement of these layers is seen in fig. 2. At first, the villi of the chorion lie loosely in the corresponding depressions of the decidua; but subsequently, the fœtal and maternal structures (the villi and the decidua vera) become closely united, so as to form one inseparable mass, by the following means: the deeper substance of the uterine mucous membrane in the region of the P. is traversed by vessels which enlarge into what, in the case of the veins, are termed *sinuses*, dip down between the villi, 'and at last swell round and between them, so that finally the villi are completely bound up or covered by the membrane which constitutes the walls of the vessels, this membrane following the contour of all the villi, and even passing, to a certain extent, over the branches and stems of the tufts.'—Goodsir's *Anatomical and Pathological Observations*, p. 60.

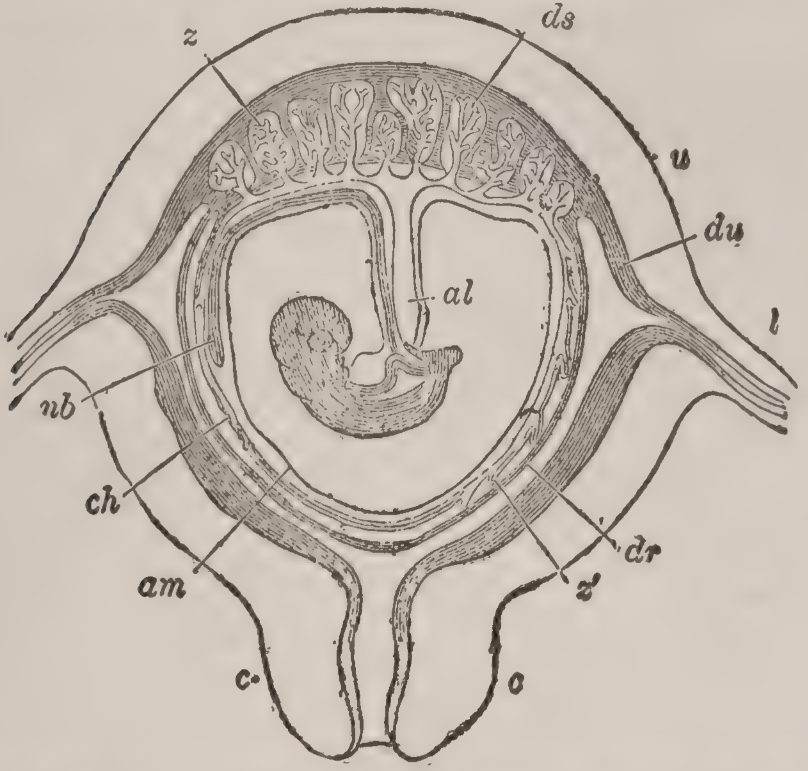


Fig. 2.—Diagrammatic Section of a Human Pregnant Uterus, with the contained Ovum:

u, uterus; *l*, oviduct (or Fallopian tube); *c*, cervix uteri (or neck of the womb); *du*, decidua uteri; *dr*, decidua reflexa; *ds*, decidua serotina; *ch*, chorion; *am*, amnion; *al*, allantois; *nb*, umbilical vesicle; *z*, villi, which form the fœtal part of the placenta; *z′*, villi over the rest of the chorion, which, in the human subject, take no part in the placental function.

The pure maternal blood is conveyed to the P. by what are termed, from their tortuous course, the 'curling arteries' of the uterus, and is returned by the large veins termed sinuses. 'The fœtal vessels,' says Dr. Carpenter, 'being bathed in this blood, as the branchiæ of aquatic animals are in the water that surrounds them, not only enable the fœtal blood to exchange its venous character for the arterial, by parting with its carbonic acid to the maternal blood, and receiving oxygen from it, but they also serve as rootlets, by which certain nutritious elements of the maternal blood (probably those composing the liquor sanguinis) are taken into the system of the fœtus. It is probable, too, that the P. is to be regarded as an excretory organ, serving for the removal, through the maternal blood, of excrementitious matter, whose continued circulation through the blood of the fœtus would be prejudicial to the latter.'—*Human Physiology*, 3d ed. pp. 1013, 1014. Moreover, recent investigations of Bernard show that the P. secretes, like the liver, the saccharine matter known as glycogen (q.v.) which probably takes part in keeping up the animal heat. The vascular connection between the fœtus and the P. is effected by the umbilical vein (containing arterial blood), and two umbilical arteries (containing venous blood), all of which lie in the umbilical cord which connects the fœtus (q.v.) with the P. The P. may be formed at any point of the uterus, but is usually on the left side. Occasionally (in 11 cases out of 600, according to Naegele) it is situated partially or entirely over the mouth of the womb (*os uteri*), in which case dangerous flooding takes place previous to or at the period of labor. This condition is known as *placenta prævia*, and under ordinary management, 'one in three of the mothers are lost, and more than 65 per cent. of the children.'—Churchill, *Theory and Practice of Midwifery*, 3d ed. p. 473. By substituting the detachment and extraction of the P. for the old method of turning the child *in utero*, Prof. Simpson finds that the mortality sinks to one in 14 of the mothers, but slightly rises (to 69 per cent.) in the case of the children.

Another difficulty in midwifery practice, but far less serious than the preceding, is undue retention of the P. In ordinary cases, the average interval between the birth of the child and the expulsion of the after-birth is a quarter of an hour. When the expulsion does not take place within an hour or an hour and a half, the case is regarded as coming under the head of 'retained placenta.' It occurs in about 1 case in 400, and in these cases is fatal to about one mother in five; the cause of death being hemorrhage. The principal causes of retention are either imperfect and insufficient, or irregular contraction of the womb after the birth of the child. In the first of these cases, if the uterus cannot be excited to sufficient action, the P. must be withdrawn by steady traction of the umbilical cord, and if it fail, extraction by the introduction of the hand (an operation always to be avoided if possible) must be resorted to; in the latter case, manual extraction is usually necessary. Sometimes, in consequence of inflammatory or other affections of the P., there may be adhesion between its outer surface and the inner surface of the womb. This is the most dangerous form of retention, there being usually excessive flooding, and additionally the peril arising from the decomposition of any portion that cannot be removed without undue violence.

The P. acquires its proper character, in the human subject, during the third month, and it subsequently goes on increasing to the full period of gestation. At about the fourth month, the blood, moving through the enlarged uterine vessels, produces a peculiar murmur, which is known as the *placental bruit*, resembling the sound made by blowing gently over the lip of a wide-mouthed phial, and increasing in intensity and strength as pregnancy (of which it is one of the characteristic signs) advances.

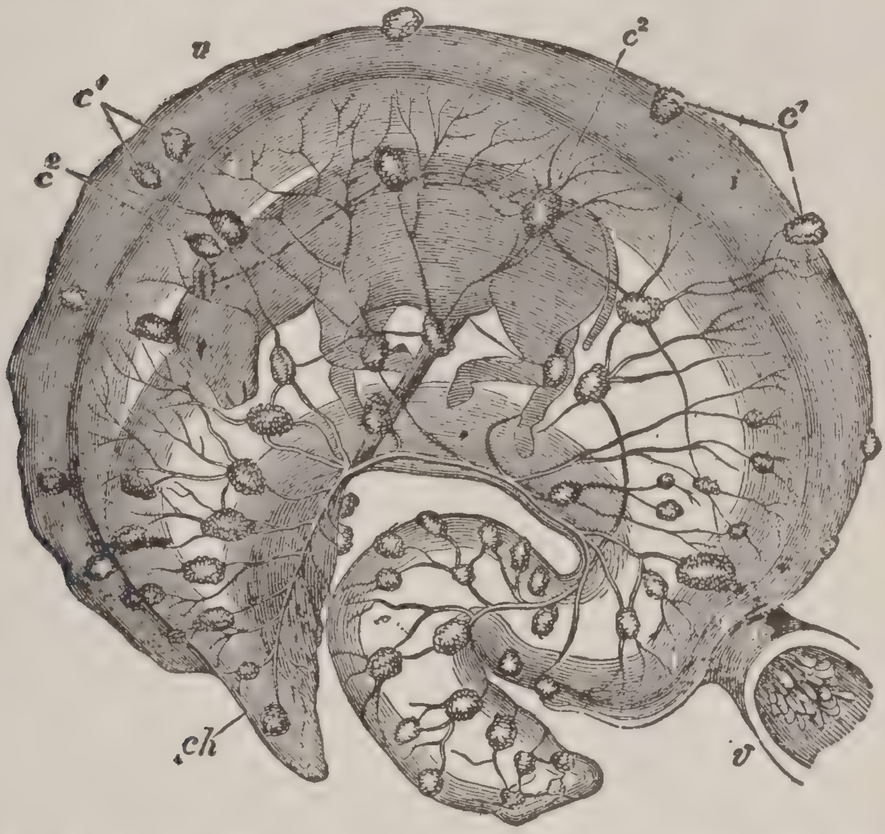


Fig. 3.—Uterus of a Cow in the middle of Pregnancy, laid open: *v*, vagina; *u*, uterus; *ch*, chorion; c^1, uterine cotyledons; c^2, fœtal cotyledons.

In animals exhibiting the second type of placental structure—e.g., the pig—the P. is comparatively simple in structure. 'No *decidua* is developed; the elevations and depressions of the unimpregnated uterus simply acquire a greater size and vascularity during pregnancy, and cohere closely with the chorionic villi, which do not become restricted to one spot, but are developed from all parts of the chorion, except its poles, and remain persistent in the broad zone thus formed throughout fœtal life. The cohesion of the fœtal and maternal placentæ, however, is overcome by slight maceration or post-mortem change; and at parturition, the fœtal villi are simply drawn out like fingers from a glove, no vascular substance of the mother being thrown off. Prof. Huxley, from whose *Elements of Comparative Anatomy* (1864, p. 103) the preceding extract is taken, follows the opinion of De Blainville, Von Baer, Eschricht, Milne-Edwards, Gervais, and Vogt in regarding 'the features of the P. as affording the best characters which have yet been proposed for classifying the monodelphous [or placental] mammals.' He proposes to apply the term *deciduate* to those animals whose P. presents the human type, and which throw off a *decidua;* and to term those animals *non-deciduate* in which the P. is constructed on the same plan as that of the pig. 'Thus,' he observes, 'man; the apes, or so-called *Quadrumana;* the *Insectivora;* the *Cheiroptera;* the *Rodentia,* to which the lowest apes present so many remarkable approximations; and the *Carnivora,* all are as closely connected by their placental structure as they are by their general affinities. With the pig, on the other hand, the ungulate quadrupeds, and the *Cetacea* which have been studied, agree in developing no decidua, or, in other words, in the fact that no vascular maternal parts are thrown off during parturition. But considerable differences are observed in the details of the disposition of the fœtal villi, and of the parts of the uterus which receive them. Thus in the horse, camel, and *Cetacea*, the villi are scattered as in the pig, and the P. is said to be *diffuse;* while in almost all true *Ruminants* the fœtal villi are gathered into bundles or cotyledons (fig. 3), which in the sheep are convex, and are received into cups of the mucous membrane of the uterus; while in the cow, on the contrary, they are concave, and fit upon corresponding convexities of the uterus.'

The remarks above on the functions of the human P. are applicable equally to all placental mammals generally.

The *diseases* of the human P. had not been studied with any accuracy until the subject was taken up by Prof. Simpson. It has been ascertained that the P. is liable to (1) Congestion, ending in the effusion of blood into the substance of the organ on its surfaces, or between the membranes; (2) Inflammation, giving rise to adhesions, or terminating in suppuration, which may occasion very serious constitutional disturbances; (3) Partial or entire hypertrophy or atrophy; (4) Fatty degeneration, affecting its small vessels. Whatever be the form of disease by which the P. is attacked, the result is usually fatal to the fœtus.

PLACEN'TA, in Botany: membrane of the interior of the Germen (q.v.) or ovary, to which the ovules are attached either immediately or by Umbilical Cords (q.v.). The P. appears sometimes as a mere thickening of the walls of the germen. In many cases, it is a more decided projection from the walls of the germen. When thus connected with the walls of the germen, the placentæ are described as *parietal* [Lat. *paries*, a wall]. But in some plants the placentæ of the different cells of the germen are united together in a column in its axis, and they are then described as *axile.* This distinction is of great importance as characterizing different nat. orders. Parietal placentæ are formed where the edges of carpellary leaves unite; but great difficulty has been experienced by vegetable physiologists in explaining the formation of axile placentæ; some regarding them as also originally formed in this manner, and others as formed in a quite different manner from the axis itself; nor is it impossible that both theories may be correct as to different orders of plants. It is certain that in many cases in which the placentæ appear as axile, they are formed from the edges of the carpellary leaves which fold in to meet in the axis, and form *Dissepiments* (q.v.) between the cells of the germen. The number of placentæ corresponds with the number of carpels in the germen, or appears to be the double of it, each carpel producing two rows of ovules instead of one. See Pistil.

PLACEN′ZA: see Piacenza.

PLACER, n. *plă-thĕr′* or *plăs′ĕr* [Sp.]: a gravelly place where gold is found by the side of a river or stream, or in its bed.

PLACID, a. *plăs′ĭd* [F. *placide;* L. *placĭdus,* gentle, calm—from *placĕre,* to please: It. *placido*]: gentle; mild; peaceful; calm; serene; tranquil; composed. Plac′idly, ad. *-lĭ.* Plac′idness, n. *-nĕs,* or Placidity, n. *plă-sĭd′ĭ-tĭ,* unruffled state; mildness; sweetness of disposition.

PLACITUM REGIUM, *plăs′ĭ-tŭm rē′jĭ-ŭm;* called also Placet, Exequatur, Lettres Patentes: act or instrument executed in virtue of the privilege claimed by the govt. in certain kingdoms to exercise a supervision over the communications of the Roman pontiff with the clergy and people of those kingdoms, and to suspend or prevent the publication of any brief, bull, or other papal instrument which may appear to contravene the laws of the kingdom, or to compromise the public interest. The early Christian emperors, it is well known, freely stretched their legislation into the affairs of the church; and one constant cause of conflict between church and state in the mediæval period was the attempt on the part of the sovereigns to control the free intercourse of the pope with the several churches. In the Pragmatic Sanction in France, and in the similar legislation of Spain, Portugal, Sicily, and the Low Countries during the 15th c., the claims of the state on the same head are asserted; and among the so-called 'liberties' of the later Gallican Church was a certain, though not a complete subjection to the state in this particular; but it was in the German states that this claim was most distinctly asserted, and most formally embodied in the constitutional law. The principle on which the Peace of Westphalia, so far as regards its religious provisions, is based, is that the will of the sovereign of the state is supreme and final in all the concerns of religion. *Cujus regio illius et religio* ('Whose the territory, his also the religion'), became the maxim of church govt.; and, of course, within certain limits, the Rom. Cath. sovereigns acted as freely on it as the Protestant. This intermixture of the spiritual and the temporal prevailed especially in the mixed governments of the ecclesiastical sovereigns of Germany, the prince-bishops of the Rhine; but without the same foundation, the system was carried to its height in Austria under Joseph II. (see FEBRONIANISM: PIUS VI.), the excessive minuteness of whose ecclesiastical ordinances procured for him the sobriquet 'The Sacristan.' Under him, all pontifical bulls, briefs, and constitutions, and all the ordinances of the local bishops, were made subject to imperial censorship, and it was forbidden to publish any of them without its receiving the *placet* of the emperor. The only exception in the case of pontifical decrees, regarded those emanating from the Roman Penitentiary (q.v.), which, as being of their nature secret, were not held subject to revision. In Prussia, the same law was enforced, also in Baden and Saxony, no less than in the Prot. govts. of Würtemberg, Saxe-Gotha, Saxe-Weimar, etc.

The 'May laws' of the kingdom of Prussia (so-called because they were enacted in May 1873,4,5), called sometimes the 'Falk laws' (from Dr. Paul Ludwig Adalbert Falk, lawyer and Prussian official who introduced them), asserted definitely the right of the state to intervene in installation of bishops, conduct of theological seminaries, discipline of the clergy, and other matters held by the church to be of purely ecclesiastical concernment. In 1876 three priests were fined and imprisoned for withholding absolution from penitents, and several newly-ordained priests were similarly punished for saying their first mass without the *exequatur* of the minister of worship. Bishops were deposed and exiled, and the temporalities of their sees provisionally sequestered. But the political necessities of the govt. after a few years, compelled Prince von Bismarck to come to terms with the Rom. Cath. party, and thereafter the May laws were administered with all possible lenity, and 1883 a bill was passed modifying those laws in several important particulars. The govt. even gave assurances to the Roman court of its willingness to make further concessions, if the church authorities would show a like conciliatory disposition. The govt. gave evidence of its sincere desire to be at peace with the church 1884 by exempting from fine and imprisonment 119 priests in the diocese of Breslau, who had incurred those penalties under the May laws. Further concessions followed 1886. In 1889 the church party were still demanding the rescission of the remainder of the May laws.

PLACK, n. *plăk* [F. *plaque*, a plate of metal—see also PLACARD]: in OE. and Scot., copper coin = $\frac{1}{3}$ part of a penny sterling.

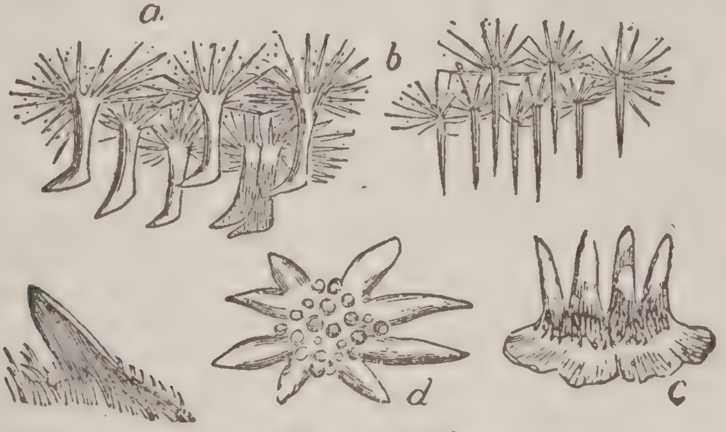
PLACKET, n. *plăk'ĕt* [F. *plaquer*, to clap on]: in *OE.*, a petticoat; a woman's pocket; a woman.

PLACO-, prefix, *plăk o-* [Gr. *plax*, *plakos*, anything flat and broad]: flat and broad.

PLACODERMATA, n. plu. *plăk'ō-der'mă-tă*, or PLAC'ODERMS, n. plu. *-dĕrmz* [Gr. *plax*, or *plăka*, a flat surface, *derma*, skin or covering]: in *geol.*, a term applied to the bony-plated or bone-encased fossil fishes of the Old Red Sandstone.

PLACOGANOID, n. *plăk-ŏg'ă-noyd* [Gr. *plax*, or *plăka*, a flat surface; *ganos*, splendor; *eidos*, appearance]: in *geol.*, a sub-order of the ganoid fossil-fishes, having the head and partly the body protected by large plates, often reticulated.

PLACOID, a. *plăk'oyd*, or PLACOIDEAN, a. *plăk-oy'dĕ-ăn* [Gr. *plax*, or *plăka*, a flat surface; *eidos*, appearance]: plate-like; having placoid scales like certain fishes. PLAC'OID FISHES, order of fishes, in the classification by Agassiz, characterized by having *placoid* scales, irregular plates of hard bone, not imbricated, but placed near together in the skin. These scales or plates are of considerable size in some fishes, but in others they are very small tubercles, e.g., in the dogfish, of which the skin forms fine-grained shagreen.



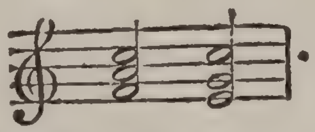
Placoid Scales.

a and *b*, placoid scales of *Aleuteres trossulas*, one of the Balistidæ, from Australia; *c*, *d*, *e*, scales from different parts of the body of *Aleuteres variabilis*.

Agassiz includes among the P. fishes those cartilaginous fishes which have no scales. The order is exclusively of *Cartilaginous Fishes* (q.v.). The existing P. fishes are few in comparison with the fossil genera and species. Placoid scales are often elevated in the middle, the centre sometimes rising into a strongly projecting point or spine. They exhibit great variety of forms, sometimes even in different parts of the same fish.

PLAFOND, n. *pla fŏnd'* [F. *plat*, flat; *fond*, the bottom, the back]: in *arch.*, the ceiling of a room, whether flat or arched; also the soffit or under side of the corona of a cornice; a soffit generally.

PLAGAL, a. *plā'găl* [Gr. *plāgĭŏs*, oblique, slanting]: in *music*, term applicable principally to *Canto Fermo* (see PLAIN SONG), and signifying collateral. Gregory the Great, in revising the labors of Ambrose, and remodelling the Plain Song (q.v.) of the church, added to the scales of Ambrose, which he distinguished as authentic, certain collateral scales, which he called plagal, possessing the peculiarity of having the octave so divided that the fourth was above the fifth. Melodies are now known as plagal whose prin cipal notes are contained between the fifth of the key and its octave or twelfth. The cadence, consisting of the subdominant harmony followed by the tonic, is called the

plagal cadence— .

PLAGI-, *plā-jĭ-*, prefix [Gr. *plagios*, slanting, oblique]: oblique; the meaning completed by the second element.

PLAGIARIZE, v. *plā′j′ă-rīz* [L. *plagiārĭus*, a man-stealer; *plagium*, kidnapping—from *plaga*, a net: It. *plagiario*, a plagiary: F. *plagiaire*]: to steal from the writings of another; to adopt, without acknowledgment, the writings of another. Pla′giarizing, imp. Pla′giarized, pp. *-rīzd*. Pla′giarism, n. *-j′ă-rĭzm*, the act of passing off another man's writings, or portions of them, as one's own; literary theft. Pla′giarist, n. *-rĭst*, or Pla′giary, n. *-rĭ*, one who adopts the writings of another, and offers them to the public as his own; a literary thief.

PLAGIO-: same as Plagi-.

PLAGIOSTOMA, n. *plā′jĭ-ŏs′tō-mă* [Gr. *plāgĭŏs*, oblique; *stoma*, a mouth]: in *geol.*, a general term applied to certain obliquely oval fossil bivalves of the oyster family. Plagiostome, n. *plā′jĭ-ŏs-tōm*, one of a group of cartilaginous fishes, including the shark, ray, and the like. Pla′gios′tomi, *-tō-mī*, in the older systems, an order of fishes containing the cartilaginous fishes with Placoid (q.v.) scales, and divided into two sub-orders, one containing sharks, and the other rays. It is now applied sometimes as a sub-class name of the same group. The P. have five or more gill openings. They have no air-bladder. Impregnation takes place before the eggs are deposited, and the males are furnished with *claspers*. Pla′gios′tomous, a. *-tō-mŭs*, relating to the plagiostomes.

PLAGIUM, n. *plā′jĭ-ŭm* [L.]: in *law*, the crime of stealing or kidnapping men, women, or children. It was punishable with death.

PLAGUE, n. *plāg* [Dut. *plage*, a wound, affliction: Ger. *plage*, trouble: L. *plāga;* Gr. *plēgē*, a blow—from *plēssein*, to strike: Gael. *plàigh*, a pestilence]: a malignant fever of great virulence, and very fatal; a pestilence, or pestilential disease; anything troublesome or vexatious at the hands of man; any great natural calamity; a state of misery: V. to vex, trouble, or annoy; to afflict with evil of any kind; to perplex; to torture. Plaguing, imp. *plāg′ĭng*. Plagued, pp. *plāgd*. Plaguy, a. *plāg′ĭ*, vexatious; troublesome. Plag′uily, ad. *-lĭ*. Plague-spot, a deadly mark or sign; a centre from which moral evil proceeds.—Syn. of 'plague, v.': to vex; torment; distress; tease; annoy; harass; trouble; molest; embarrass; perplex; tantalize; afflict; torture; disturb.

PLAGUE: malignant contagious fever prevailing at some times and places epidemically; characterized by buboes, or swellings of the lymphatic glands, by carbuncles and petechiæ, and not apparently furnishing any security against its recurrence in the same individual. For a history of the origin of the plague in the far East (China), and its gradual spread, under the name *Black Death* (q.v.), through Asia and Europe, in the 14th c., see Hecker's *Epidemics of the Middle Ages* (1844, pub. by the Sydenham Soc.). Its true and permanent home seems to be in the regions bordering the e. extremity of the Mediterranean. At different periods of the 15th, 16th, and 17th c. it visited w. Europe. It last attacked London and almost all England 1663–65; while so late as 1720 it destroyed nearly half the population of Marseilles; and seventy years afterward prevailed in Russia and Poland, since which time it has been almost unknown in w. Europe. It is now limited chiefly to Egypt, Syria, Anatolia, Greece, and Turkey, occasionally extending n. toward Russia, and w. as far as Malta.

The disease usually commences with a sensation of intense weariness and fatigue, slight shivering, nausea and sickness, confusion of ideas, giddiness, and pain in the loins. These symptoms are rapidly followed by increased mental disturbance, with occasional stupor and delirium, by alternate pallor and flushing of the face, by suffusion of the eyes, and a feeling of intense constriction in the region of the heart. Darting pains are felt in the groins, armpits, and other parts of the body, soon followed by enlargements of the lymphatic glands, or *buboes* (which appear in some cases on the first and second day, in some not till near the close of the disease, and in others are altogether absent), and by the formation of *carbuncles* on various parts of the body. As the disease advances, the tongue becomes dry and brown, while the gums, teeth, and lips are covered with a dark fur; the bowels, at first constipated, become relaxed, the stools being dark, offensive, sometimes bloody. The power of the will on the muscles is much impaired; and altogether the patient resembles a person in intoxication. Throughout the disease there is more or less tendency to faintness; and usually about the second or third day, petechial spots, livid patches like bruises, and dark stripes (called *vibices*), appear on the skin, especially in severe cases. These discolorations are due to extravasation of blood, and are often accompanied with hemorrhagic discharges from the mucous membranes In fatal cases the pulse gradually sinks, the surface becomes cold and clammy, blood oozes from the mucous surfaces, there is coma, or low delirium; and death occurs usually in five or six days, either without a struggle, or preceded by convulsions.

Great difference of opinion exists as to the cause of plague. Some maintain that it is propagated exclusively by a peculiar contagion; others, while admitting its contagious nature, maintain that it may also be spontaneously engendered by endemic or epidemic influences; while others reject the contagion view altogether, and assert that it originates exclusively in local causes or epidemic influences. Of these three views, the great mass of evidence goes to show that the second is the correct one. Whatever may be the cause of the disease, temperature appears to exert a considerable influence over it. In tropical climates the disease is unknown, and the cold weather of n. climates has been observed to check its ravages. In Europe it has always been most fatal in the summer and autumn, especially Sep. Thus, in the great plague of London 1665, the deaths from the plague were, in June, 590; July, 4,129; Aug., 20,046; Sep., 26,230; Oct., 14,373; Nov., 3,449; Dec., less than 1,000.

The exact nature of the disease is unknown. Some poison whose characters evade all chemical and microscopical examination, is absorbed, and alters at once, or after short incubation, the composition of the blood and the condition of the tissues.—See PESTILENCE. Little can be done to arrest the disease in any individual case. The patient should, if possible, be removed at once from the source of the disease; he should be exposed freely to fresh air; his secretions should be duly regulated, and his strength supported as far as possible. Friction with olive oil has been strongly recommended, but subsequent experience has not shown its value. But though treatment is comparatively valueless, much may be done toward guarding against the disease. There can be little doubt that it is due to free external use of cold water, perfect cleanliness, moderate habits of life, and superior ventilation, that European (especially English) residents in the infected cities of the Levant are comparatively exempt from this disease. It is possible that inunction of the body with olive oil may be (as has been asserted) a useful prophylactic agent, though it fails to cure the disease. All unnecessary communication with the sick, or contact with clothes or other matter that may have been infected with the poison, should be as much as possible avoided.

PLAICE, n., or PLAISE, *plās* [Dut. *platdijs;* F. *plie;* Ger. *platteisse*, a plaice—from L. *platessa*, a flat fish], (*Platessa vulgaris*): species of Flounder (q.v.), resembling the common flounder, but rather broader in proportion to its length; the upper surface of the body and the fins olive-brown, marked with large bright orange spots; a row of similar spots on the dorsal fin and on the anal fin; no tubercular asperities on any part of the body, but a curved row of bony tubercles on the eye-side of the head. The P. inhabits sandy and muddy banks, not in very deep water, and is very abundant on most of the coasts of Europe. Like the common flounder, it often ascends slow rivers to some distance from the sea, and it has even been found to thrive when transferred to fresh-water ponds. It feeds on worms, mollusks, small crustaceans, and young fishes. It has been known to attain the weight of 15 lbs., but a P. of 7 or 8 lbs. is accounted large. It is taken both by lines and trawl-nets. It is in considerable esteem for the table, though so plentiful in some countries as to be very cheap.

Amer. P. (*Paralichthys dentatus*), called also SUMMER FLOUNDER, TURBOT FLOUNDER, is of a genus represented on the coasts of the Pacific and Indian oceans, but not of Europe. As usual with many fish, it has a great variety of confusing names, e.g. Brail and Puckermouth in R. I., and Deep-sea Flounder in Boston and New York. It resembles young Halibut, and next to Halibut is the most valuable flat-fish on our coast, ranging from Cape Cod to Paraguay; in summer frequenting shallow waters. Its length varies from 16 in. to 3 ft. Immense numbers are taken in s. New England. Four other species, smaller, are found on the Atlantic coast of N. Amer., where also occur 26 species of flat-fish, and nearly as many on the Pacific coast.

PLAID, n. *plăd* or *plād* [Gael. *plaide*, a blanket. comp. Goth. *paida*, a coat]: a long and broad strip of woolen cloth checkered black and white, or in variegated colors, worn loosely as a scarf or shawl over or wrapped around the person; used chiefly by the rural population in Scotland (see TARTAN). PLAID'ING, n. the coarse woolen cloth used for plaids, blankets, etc. PLAIDEN, n. *plăd'ĕn* or *plād'ĕn*, or PLAIDING, n. *plăd'ĭng* or *plād'-*, twilled coarse woolen cloth. PLAIDIE, n. *plād'ĭ*, a little plaid; a plaid.

PLAIN, a. *plān* [F. *plain*—from L. *plānus*, even, level: Sp. *plano*, plain, level]: without ornament or embellishment; homely; artless; frank; sincere; candid; easily understood; not difficult; clear; not luxurious, as in food; smooth, level, or flat: AD. not obscurely; distinctly: N. land approximately level; a flat expanse—extensive plains in Asia are called *Steppes* (q.v.), in Africa *Deserts* (q.v.), in S. Amer. *Pampas* (q.v.), and *Llanos* (q.v.), in N. Amer. in the eastward and central states *Prairies* (q.v.), in the southward states *Savannahs* (q.v.). In Europe, 'plains' denotes specifically the great plains of w. Europe—the region bounded by the Elbe, the Harz Mountains, France, and the sea.—An elevated plain is called a *plateau* or tableland. In *OE.*, PLAIN, v. for COMPLAIN; lament; wail. PLAIN'LY, ad. *-lĭ*, in a plain manner; fairly; clearly; not obscurely. PLAIN'NESS, n. *-nĕs*, quality or state of being plain; levelness; flatness; want of ornament or show; rough sincerity; artlessness. PLAIN-DEALING, a. frank; open; void of art: N. speaking or acting with openness and sincerity; sincerity. PLAIN CHART and PLAIN SAILING: see under PLANE. PLAIN-SPEAKING, n. frankness; candor. PLAIN-SPOKEN, a. rough; speaking with unreserved sincerity. PLAIN WORK, needle-work, as distinguished from embroidery.—SYN. of 'plain, a.': apparent; clear; visible; manifest; obvious; evident; conspicuous; even; level; flat; smooth; open; artless; frank; undisguised; unaffected; candid; honest; sincere; unvarnished; unembellished; ingenuous; simple; distinct; unreserved; downright; unornamental; mere; bare; discernible; intelligible; unobscure; not pretty.

PLAINFIELD: town, Windham co., Conn.; on the New England r.r., 27 m. w. of Providence, R. I. It manufactures cotton and woolen goods, carriages, and bricks. Pop. (1890) 4,582; (1900) 4,821.

PLAINFIELD, *plān'fēld:* city, Union co., N. J.; on the Central railroad of New Jersey, and on Green Brook; 24 m. w.s.w. from New York, about 16 m. s.w. of Newark. There are 14 churches; several schools (one, the first free school opened in the state), an institute, and a seminary; two monthly, two weekly, and two daily papers; a savings bank, and two national banks (cap. $350,000). There are machine-shops and large manufactories of hats and clothing. The surrounding agricultural region is productive, and there are several villages near, with which there is considerable trade. The scenery is pleasing, and the locality is considered very healthful. The place is one of the most attractive suburbs of New York. In 1684 a house was built about two m. from the present site of the city. P. was regularly laid out 1735, and incorporated as a city 1869. Many people doing business in New York reside here. Pop. (1870) 5,095; (1880) 8,125; (1890) 11,267; (1900) 15,369.

PLAIN SONG, or Canto Fermo, *kăn'tō fĕr'mō* [Ital.] name given by the Church of Rome to the ecclesiastical chant; an extremely simple melody, admitting only notes of equal value, rarely extending beyond the compass of an octave, and never exceeding nine notes, the staff on which the notes are placed consisting of only four lines. The clefs are C and F. St. Ambrose is deemed the inventor or systematizer of Plain Song. His labors consisted in selecting from the extremely complicated system of the Greeks a set of scales sufficiently few and simple for a very rude people. During the two centuries after his death, his institutions fell into confusion. Gregory the Great revived and perfected them, recasting them into an *Antiphony*, or authorized body of ecclesiastical music, and brought Plainsong into the state in which it is yet used in the Roman Church. See Ambrosian Chant: Gregorian Chant.

PLAIN-STANES, n. *plān'stānz* [Eng. *plain;* Scot. *stanes*, stones]: the pavement of a street.

PLAINT, n. *plānt* [F. *plainte*, complaint—from *plaindre*, to pity—from L. *plangĕrĕ*, to bewail]: audible expression of sorrow; lamentation; a memorial tendered to a court of law, in which the person sets forth his cause of action against the offender. Plaintiff, n. *plānt'ĭf* [F. *plaintif*, making complaint]: in *law*, person who institutes and maintains a civil action or suit against another called the Defendant. In *Scotland*, a plaintiff is called a Pursuer. In proceedings and applications of a civil nature commenced by petition, the party taking the initiative is called the Petitioner. Plaint'ive, a. *-ĭv*, expressing grief or sorrow; touching; sad. Plaint'ively, ad. *-lĭ*. Plaint'iveness, n. *-nĕs*, the quality or state of being plaintive.

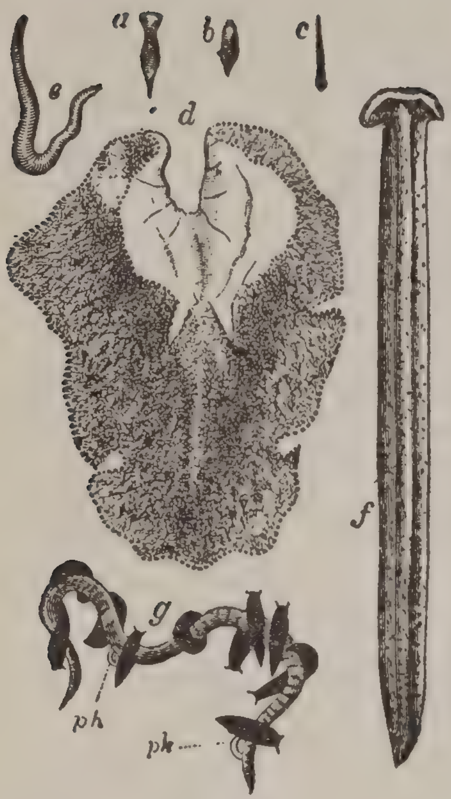
PLAIT, n. *plāt* [from Eng. *plight*, a fold, a bending: F. *plier* or *ployer*, to plait, to fold—from L. *plicārĕ*, to fold: W. *plygu*, to double or fold: OF. *ploit*, a plait]: a fold; a double, as of cloth; a braid, as in a lady's hair; the narrow strips of straw-work for making straw hats: V. to fold or double; to double into narrow strips· to interweave; to braid; to entangle. PLAIT'ING, imp. PLAIT'ED, pp.: ADJ. folded; interwoven. PLAIT'ER, n. *-ér*, one who plaits: also spelled PLEAT.

PLAN, n. *plăn* [F. *plan*, a plan or scheme—from L. *plānus*, flat, level]: a drawing or representation of anything on a flat surface, as of a building; a sketch; a design; a scheme. The term is applied to all kinds of architectural drawings, but ought to be limited to those representing the horizontal sections of the various floors of buildings. Plans show the disposition of the apartments and walls, with situation of fireplaces, closets, doors, windows, stairs, etc.; they, in fact, represent the different stories as they appear successively from above, when the walls are built two or three ft. above the level of each floor: V. to form a sketch or representation of any intended work on a flat surface; to devise or scheme. PLAN'NING, imp. scheming; devising. PLANNED, pp. *plănd:* ADJ. devised. PLAN'NER, n. *-ér*, one who plans.—SYN. of 'plan, n.': design; scheme; project; draught: delineation; outline; sketch; plot; contrivance; device; diagram; form.

PLANARIA, *plă-nā'rĭ-a:* name of flat-worms of the ord. *Turbellaria*, class *Platyhelminthes*. They much resemble the flukes (e.g., the liver-fluke), but are not parasitic, except several species that infest echinoderms. A common species is the dark brown *P. torva*, ¼ to ⅓ in. long. The white semi-transparent *Dendrocœlum lacteum* lives under stones and sticks in ponds, and its branching alimentary tube, easily seen, is characteristic of one suborder. Most of the P. have the remarkable power of projecting missiles from their skin—minute, stiff rods, which, by trial with a Ceylonese species, were found to irritate the experimenter's tongue. A U. S. land-planarian is *Rhyncodesmus sylvaticus.* The species are numerous. Some inhabit fresh, others salt water; some, the land. They are generally found creeping among confervæ, or on stems of plants. Many larger marine species swim freely by flappings of the broad margins of their bodies. Two specks in the fore-part of the body of many species have been supposed to be eyes; but there is no proof of it. Planarians are hermaphrodite, but copulate for mutual impregnation. Their power of multiplication by self-division is very great; and if an individual be cut in pieces, each piece continues to live and feel, and 'even if it be the end of the tail, as soon as the first moment of pain and irritation has passed, begins to move in the same direction as that in which the entire animal was advancing, as if the body was actuated throughout by the same impulse; and, moreover, every division, even if it is not more than the eighth or tenth part of the creature, will become complete and perfect in all its organs.'—*Rymer Jones.*

PLANCH, v. *plănsh* [F. *planche*, a plank—from mid. L. *planca*]: in *OE.*, to cover over with boards or planks; to patch. PLANCH'ING, imp.: N. wooden flooring. PLANCHED, pp. *plănsht:* ADJ. made of boards. PLANCH'ER, n. *-ér*, a floor of wood.

PLATE 1.



a, Convoluta paradoxa. b, Vortex viridis. c, Monotus fuscus. d, Thysanozoom brochii. e, Rhynchodemus sylvaticus. f, Bipalium ceres. g, Polycelis cornuta, attached by the pharynx (*ph*) to a dead worm. All the figures reduced one-fifth from the natural size, and viewed from the dorsal surface.

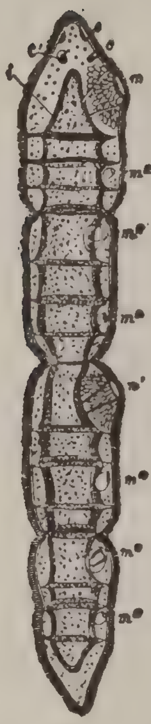


Fig. 9.

Planarian undergoing division. There are 16 individuals, 8 with mouth apparatus, showing the buds of the first (*m*), second (*m'*), third (*m''*), and fourth (*m'''*) generations. The fifth generation has not yet acquired (*a*) mouth; (*e*) eye spots; (*i*) intestines.

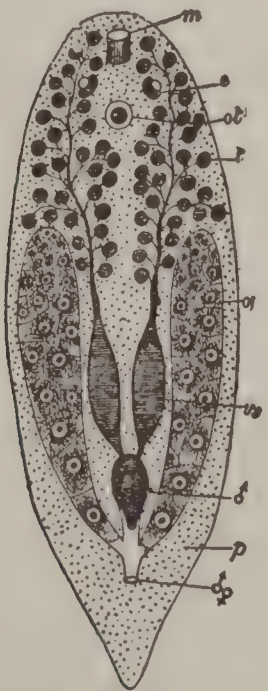


Fig. 4.

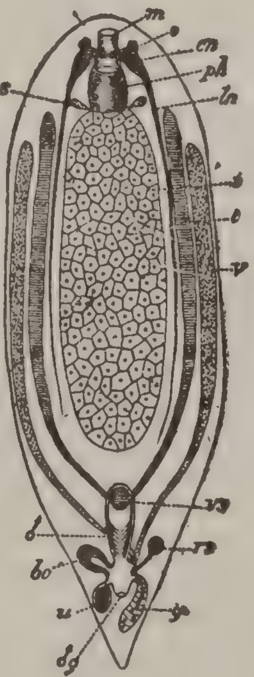


Fig. 5.

Fig. 4. Plan of Accœlous Turbellarian. Fig. 5. Plan of Rhabocœlous Turbellarian. (*e*) Eye; (*m*) mouth; (*p*) digesting parenchyma.

PLANCHET, n. *plănsh'ĕt* [F. *planchette*, a little board—from *planche*, a plank (see PLANK)]: a flat piece of metal prepared to be made into coin. PLANCHETTE, n. *plăng-shĕt'* [F.]: curious toy of French invention, to which some believers in spiritualism have ascribed the power of returning answers from the spirit-world. It consists of a heart-shaped board seven or eight inches at its greatest breadth and length, mounted on two pentagraph wheels, about two inches high, at its widest part, while a pencil fastened at the apex forms its third support. Placed upon a table with a sheet of paper under it, and one or two persons with the necessary qualifications having their hands upon its tablet, setting it in motion, it is found, through marks by its pencil, to return answers to questions sometimes puzzling.

PLANE, a. *plān* [L. *plānus*, level (see PLAIN)]: level; flat; even; without elevations or depressions, as the surface of water at rest; opposed to a *curved surface:* N. an even or level surface; in *geom.*, a surface without curvature (see below): an imaginary surface assumed to cut and pass through a body, or one of the supposed curves of the celestial sphere; in *surv.*, a level surface parallel to the horizon; tool for smoothing wood (see below): V. to make level or smooth as with a carpenter's *plane;* to free from inequalities of surface. PLAN'ING, imp. PLANED, pp. *plānd.* PLANER, n. *plān'ėr*, in *printing*, a flat piece of wood used by the compositor to make the surface of the type in the form quite level. PLANE GEOMETRY, the geometry that regards plane figures or surfaces only. PLANE TRIGONOMETRY regards the measurement of plane angles. PLANE ANGLE, an angle contained by two straight lines or surfaces. PLANE CHART, a chart constructed on the supposition that the earth is an extended flat surface. PLANE IRON, the cutting-iron inserted in a carpenter's plane. PLANE OF DEFILADE, in *fort.*, a plane supposed to pass through the crest of a work parallel to the plane of sight. PLANE OF SIGHT, the general level of the ground on which a work is constructed, whether horizontal or inclined to the horizon. PLANE SAILING, the method of solving, or partially solving, problems in navigation, on the supposition that the path of the ship is described on a plane surface—opposed to *spherical sailing*, which takes account of the true form of the earth's surface. PLANE-TABLE, in *surv.*, an instrument or board for drawing plans on the field.

PLANE: tool for rendering the surface of wood smooth and level. It consists of an oblong block of wood or metal, with an opening through the centre; this opening is square on the upper side, and is always large enough to admit the cutting instrument; it diminishes down to a mere slit on the under side, just wide enough to allow the cutting edge of the plane-iron and the shaving of wood which it cuts off to pass through. The form of this opening will be seen at *a*, fig 1, which represents the section of a common jack-plane. The essential part of the tool is the plane-iron, a piece of steel with a chisel-shaped edge, and a slot in its centre for a large-headed screw to work and to attach to it a strengthening plate. Fig. 2 shows the plate-iron, and fig. 3 the same with the strengthening plate attached; these are shown in their proper position at *bd* in the section fig. 1, and they are held in place by the hard-wood wedge (fig. 4), seen also in the section at *c*. By driving in the wedge, the irons are held very firmly in their place, and they are so adjusted that only the fine sharp chisel-edge of the cutting-tool projects through the slit in the bottom of the body of the plane, so that when the tool is pushed forward by the force of the hand, the cutting edge pares off all irregularities, until the wood is as smooth as the under surface of the plane. There are many modifications in this tool, which can have its cutting edge and under surface made to almost any contour, so that moldings of all kinds may be made. The two commonest are the jack-plane for rough work, and the smoothing-plane for finishing off plane surfaces.

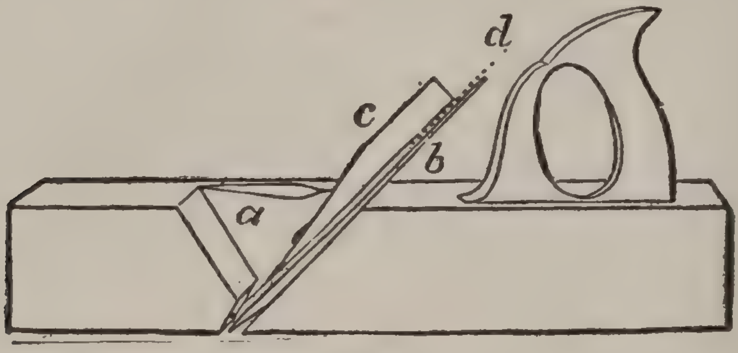
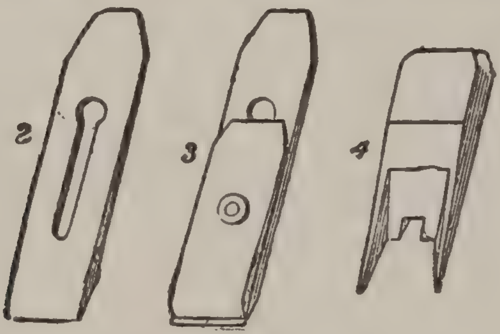


Fig. 1.



Planing-machines have come largely into use, by which both wood and metal are planed. In those intended for wood, the cutting instruments are moved forward over the wood by machinery in the same manner as in the hand-plane. The precision and rapidity with which these machines work have given great facilities for building, as one machine will do as much work as 60 men. The planing machines for metal are different in principle. A well-tempered, chisel-edged steel cutter is held in a fixed position, pressing downward upon the metal plate, which is moved forward by powerful machinery. The action of this movement is, that a groove is plowed into the metal of the size of the steel cutter; when the metal has travelled its full length, and has made the groove complete, the downward pressure of the tool is removed, and by the action of the double screw which has carried it forward, it is returned, and readjusted for another groove to be formed by the side of the first; and this is repeated until the whole surface of the plate is reduced to the required level. However tedious this process may appear, it offers facilities for metal working previously unknown.

PLANE: see Plane-tree.

PLANE, in Geometry: a surface without curvature, whose test is, that any two points whatever being taken in the surface, the straight line which joins them lies wholly in the surface. When two planes cross or intersect one another, their common section is a straight line; and the inclination of the planes to each other is measured by taking any point in their common section, and drawing from it two straight lines, one in each plane, perpendicular to the common section; the angle contained by these lines is the angle of inclination of the planes. When the angle is a right angle, the planes are perpendicular to each other.

PLANER-TREE, *plă'nėr-trē* (*Planera*): genus of trees with small elm-like leaves, with which the small axillary flowers come forth; stamens 4–5, styles 2; fruit ovoid, nut-like, not winged. In our species (*P. aquatica*) the fruit is stalked in the 4–5-cleft calyx, and has rough projections. It grows in wet banks in Ky. and southward. It follows the elms and precedes the Hackberry in the sub-family *Ulmaceæ*, Elm family, in the *Urticaceæ*.

PLANET, n. *plăn'ĕt* [Sp. *planeta;* F. *planète;* L. *planēta*, a wandering star: Gr. *planētēs*—from *plan'aō*, I cause to wander]: one of the globes in the solar system, moving round the sun like our earth (see below). Planetary, a. *plăn'ĕt-ėr-ĭ*, pertaining to the planets; consisting of or produced by planets; revolving or erratic. Planetarium, n. *plăn'ĕt-ā'rĭ-ŭm* (see below). Planetoids, n. plu. *plăn'ĕt-oydz* [Gr. *eidos*, resemblance], (see below). Planet-struck or -stricken, a. affected by the influence of planets, as was believed of old; blasted. Planet-wheel, a wheel revolving around or within the circumference of another, by which it is kept in motion.

PLAN'ET, Intramercurial: supposed planet between Mercury and the sun. Recent observations during solar eclipses fail to confirm the supposition, and therefore discredit a former announcement in its favor.

PLANETA, *plā-nē'tâ:* Greek name of the vestment called by the Latins Casula, and in English 'Chasuble,' worn by priests in the celebration of mass. The form of this vestment in the modern Roman Church differs both from the ancient form and from that in the Greek Church. The change appears to date from the 9th c., but has been gradual. A certain modification of the Roman planeta was recently introduced in England under the inspiration of Pugin, the great reviver of Gothic architecture and ecclesiastical costume and decoration. But its use has been only partial even in England.

PLANETARIUM, *plăn-ē-tā'rĭ-ŭm:* machine much employed by astronomers in the 17th and 18th c., and constructed first by Huyghens and Römer, for exhibiting the motion of the heavenly bodies in conformity with the Copernican doctrine. The P. exhibited only the orbital motions of the planets about the sun, either in circles or ellipses, and with constant or varying motions, according to the perfection of the machine. It was subsequently supplemented by the *combined tellurian and lunarian,* which exhibited at one and the same time the motion of the moon about the earth and that of the latter round the sun, with the principal phenomena (such as the succession of day and night, the varying length of each, eclipses, and the motion of the moon's apogee and nodes). The old P. was superseded by the Orrery (q.v.). The most perfect apparatus of this kind, exhibited by Perini in London 1880, occupies a pillared chamber with a hemispherical dome, and displays the solar system with the proper movements of the various members at proportionate velocities.

PLANETOIDS, *plăn'ĕ-toydz,* or As'teroids: numerous very small planets grouped in the solar system between Mars and Jupiter. Till the 19th c. they remained undiscovered; though for some years their existence had been suspected, mainly from the remarkable hiatus in the series of the planetary distances when compared with the law of Bode (q.v.). On the first day of the 19th c. the first of them was detected by Piazzi of Palermo, and his success roused astronomers to search for more. Olbers (q.v.) discovered two 1802 and 07, and Harding one 1804; but as all researches for some time subsequent to 1807 were unavailing, astronomers gradually came to the belief that no more planetoids remained to be discovered, when the detection of a fifth by Hencke 1845, revived the search, and almost every year since has added to the list. The number now known is more than 350. This remarkable success of the astronomers of our time is due to the systematic manner in which the zodiacal belt has been explored, and the place and apparent size of every star of this region distinctly determined; so that the presence of a wandering body can at once be detected; due also to progress of photography.

The magnitudes of these bodies have not been accurately ascertained, but it is certain that they are exceedingly small as compared even with Mercury, the least of the other planets; the diameter of the largest among them being generally believed not to exceed 450 m., while most of the others are very much smaller than this. They in general differ from the rest of the planets in other respects; their orbits are of greater eccentricity, are inclined to the ecliptic at a greater angle, and are interlaced in a most intricate manner, crossing each other so frequently as to form, viewed perpendicularly, a kind of network. The consequence of this is, that a planetoid, nearest the sun at one part of its orbit, is, when at another part of its orbit, further from it than are several of the others, and a mutual eclipsing of the sun at different periods by two planetoids must be very frequent. Of the planetoids, of which the elements had in 1884 been satisfactorily calculated, Medusa (No. 149) has the shortest period of revolution, 1137·69 days, and Hilda (No. 153) the longest, 2869·92 days. The corresponding mean distances from the sun, expressed in parts of the earth's mean distance, are respectively 2·13275 and 3·95228. Till 1876, the extremes known in this respect were Flora and Sylvia respectively. The nearest approach to the sun is made by Phocea (perihelion distance, 1·787). Freia recedes furthest from him (aphelion distance, 4·002). Polyhymnia's orbit has greatest eccentricity, 0·33998; Lomia's, the least, 0·2176. Massalia's orbit makes a smaller angle—only 41′ 7″—with the ecliptic than that of any other planet in the solar system, while the inclination of the orbit of Pallas is no less than 34° 42′ 41″. After the first two or three of these bodies had been discovered, the opinion was propounded by Olbers that they were but the fragments of some large planet: and this hypothesis received corroboration from the intimate connection shown to subsist among them; but of late years it has fallen out of favor with astronomers. Some infer that the P. are accounted for best by the nebular hypothesis. It has been calculated that the combined mass of all the P. cannot exceed one-fourth of the earth's mass.—The number of known P.—(1877) 240—amounted 1890, Oct. 5, to 300; 1896, Dec, 423; during one year 15 were found by Charlois. The rate of discovery has for several years averaged about 10 P. per year.

Plane-tree (*Platanus orientalis*).

PLANE-TREE, n. *plān'-trē* [F. *plane;* L. *plăt'ănus,* a plane-tree: Gr. *plat'anos*—from *platus,* broad]: large tree so named from its broad-spreading leaves. The plane (*Platanus*) is the sole genus of trees of nat. order *Platanaceæ.* The flowers are in globose, small, pendulous, long-stalked catkins, which give the tree a peculiar appearance in winter; the ovary is one-celled, and contains one or two pendulous ovules. The species are few; natives of temperate climates in the n. hemisphere; tall trees, with deciduous large leaves, and smooth whitish bark annually scaling off in large pieces.—The ORIENTAL P. (*P. orientalis*), native of Greece and the East, was planted by the Greeks and Romans as an ornamental tree, no other tree, indeed, commanding equal admiration; and for centuries the youth of Greece assembled under its shade in the groves of Academus to receive lessons in philosophy. The P. is still planted for shade and ornament in s. Europe. Many fine trees exist in England, but they were formerly much more numerous, many having died in the end of the 18th c. No tree better endures the atmosphere of a large city, and there are no finer trees in London than its plane-trees. In the East the P. attains immense size: one in the meadow of Buyukdereh on the banks of the Bosporus, is 141 ft. in circumference at the base, extends its branches 45 ft. from the trunk, and is believed to be more than 2,000 years old. The wood of the P., when young, is yellowish-white; when old, it is brownish, fine grained, takes high polish, and is esteemed for cabinet-making. A rich alluvial soil and the vicinity of water are most suitable to this tree.—The NORTH AMERICAN PLANE, BUTTONWOOD, or SYCAMORE (*P. occidentalis*), is very similar. It is the largest deciduous tree of the United States, and abounds on the banks of the great rivers of the middle states. Its timber is not very valuable, and is very liable to decay. A tree of this species on the bank of the Thames, in Chelsea Hospital gardens, is 115 ft. high, with a trunk five ft. in diameter.

PLANETS [Gr. *planētes*, 'a wanderer']: those heavenly bodies (including the Earth) which belong to our solar system, and revolve in elliptic orbits round the sun. They are often denominated *primary planets*, to distinguish them from their moons or satellites, which are called *secondary planets.* The name planet is of considerable antiquity, and was applied to these dependants of the sun to distinguish them from the myriads of luminous bodies which stud the sky, and which present to the naked eye no indication of change of place (see STARS). The planets at present known are, in the order of their distance from the sun, Mercury, Venus, the Earth, Mars, the Planetoids (q.v.), Jupiter, Saturn, Uranus, and Neptune. Six of these, Mercury, Venus, the Earth (not then reckoned a planet), Mars, Jupiter, and Saturn, were known to the ancients; Uranus was discovered by Sir William Herschel (q.v.) 1781; and Neptune, after having its position and elements determined theoretically by Leverrier and Adams, was discovered by Challis, and afterward by Dr. Galle, 1846. The Planetoids, of which more than 420 are now known, all have been discovered during the 19th c. Five of the planets, the Earth, Jupiter, Saturn, Uranus, and Neptune, are attended by one or more satellites; Uranus (usually), Neptune, almost all the Planetoids, and all the satellites except the Moon, are invisible to the naked eye. The visible planets can be at once distinguished from the fixed stars by their clear steady light, while the latter have a sparkling or twinkling appearance. The comparative proximity of the planets may be proved by examining them through a telescope of moderate power, when they appear as round luminous disks, while the fixed stars exhibit no increase of magnitude. The planets, as observed from the Earth, move sometimes from w. to e., sometimes from e. to w., and for some time remain stationary at the point where progression ends and retrogression commences. This irregularity in their movements was very puzzling to the ancient astronomers, who invented various hypotheses to account for it: see PTOLEMAIC SYSTEM: EPICYCLE. The system of Copernicus, by assuming the sun, and not the Earth, as the centre of the system, explained with admirable simplicity what was before a maze of confusion.

The planetary orbits differ considerably in their degrees of eccentricity, the Planetoids, Mars, and Mercury being most, and the larger planets least eccentric. No two planets move exactly in the same plane, though, as a general rule, the planes of the larger planets most nearly coincide with that of the ecliptic. The larger planets are consequently found always within a small strip of the heavens on both sides of the ecliptic; while the smaller have a far wider range, Pallas, one of them, having the angular elevation of its orbit no less than 34° 42″ above the ecliptic. According to Kepler's (q.v.) Laws, the nearer a planet is to the sun the shorter the time of its revolution. The arrangement of the planets in the solar system bears no known relation to their relative size or weight, for though Mercury, Venus, and the Earth follow the same order in size and in distance from the sun, yet Mars, though further from the sun, is much less in size than either the Earth or Venus, and the Planetoids, still further away, are the least of all. Jupiter, which is next in order, is by far the largest, being about 1½ times as large as all the others together; and further outward, the planets become smaller and smaller, Saturn being less than Jupiter, Uranus than Saturn, and Neptune than Uranus.

With reference to their distance from the sun, as compared with that of the Earth, the planets are divided into *superior* and *inferior;* Mercury and Venus are consequently the only 'inferior' planets, i.e., nearer the sun; all the others being 'superior.' The inferior planets must always be on the same side of the Earth as the sun is, and can never be above the horizon of any place (not in a very high latitude) at midnight; they are always invisible at their superior and inferior conjunctions, except when, at the latter, a *transit* (see SUN) takes place. The superior planets likewise are invisible at conjunction, but when in opposition they are seen with the greatest distinctness, being then due south at midnight. The time which elapses from one conjunction to its corresponding conjunction is called the *synodic period* of a planet, and in the case of the inferior planets must always be greater than the true period of revolution.

Mercury, the planet nearest the sun, is also, except the Planetoids, the smallest (being only 3 times the size of the Moon), and performs its revolution round the sun in the shortest time. Its greatest elongation is never more than 28° 45′, and consequently it is never above the horizon more than two hours after sunset, or the same time before sunrise; on this account, and from its small apparent size (5″ to 12″), it is seldom distinctly observable by the naked eye. It shines with a peculiarly vivid white or rose-colored light, and exhibits no spots.

Venus, next in order of distance and period, is to us the most brilliant of all. Its orbit is more nearly a circle than any of the others; and at its inferior conjunction it approaches nearer the Earth than any other planet. Its apparent angular dimensions thence vary from 10″ at the superior to 70″ at the inferior conjunction. Its greatest elongation varies from 45° to 47° 12′, and therefore it can never be above the horizon much longer than three hours after sunset, or the same time before sunrise. While moving from the inferior to the superior conjunction, Venus is a *morning star;* and during the other half of its synodic period, an *evening star*. When this planet is at an elongation of 40°, its brilliancy is greatest, far surpassing that of the other planets, and rendering a minute examination through the telescope impossible. At this period it sometimes becomes visible in the daytime, and after sunset is so bright as to throw a distinct shadow. Astronomers have repeatedly attempted to ascertain the nature and characteristics of its surface, but its brightness so dazzles the eyes as to render the correctness of their observations at best doubtful. From the changes in the position of dusky patches on its surface, which have been frequently noticed, it is concluded that it revolves on its axis, and that its equator is inclined to the plane of its orbit at an angle of 75°; but many astronomers doubt these conclusions. Both Venus and Mercury necessarily exhibit phases like the Moon. For *transits* of Venus, see SUN.

The *Earth*, the next planet in order (see EARTH, THE), has a single satellite, the *Moon* (q.v.).

Mars, nearest of the superior planets, is much inferior in size to the two previous, its volume being about $\frac{1}{7}$ of the Earth's; and, after Mercury, its orbit is much more eccentric than those of the other planets. When it is nearest to the Earth (i.e., in opposition), its apparent angular diameter is 30′; when furthest from it (i.e., in conjunction), not more than 4″. Mars revolves on its axis (inclined at an angle of 28° 27′) in 24 hours 37 minutes, and its year is 687 days long. In 1877 Hall of Washington discovered that it had two satellites. It shines with fiery red light, and is a brilliant object in the heavens at midnight when near opposition; when seen through the telescope its surface appears covered with irregular blotches, some of reddish, others of greenish color, while at each pole is a spot of dazzling white. The red spots are surmised to be land; the green, water; while the white spots at the poles are with some reason supposed to be snow, since they decrease when most exposed to the sun, and increase under the contrary circumstances. The Phases (q.v.) of Mars range between full, half, full (in conjunction, if visible), and half. More than 20 yrs. ago Proctor mapped the surface of Mars, according to the keen-eyed observations of Dawes, the supposed land reddish, the oceans blue, as they appear telescopically; both features of limited extent, with long, finger-like straits, mostly connecting the polar seas. In 1877 the exceptionally clear skies of Italy and Schiaparelli's remarkable acuteness of vision astonished the world by the revelation of a network of lines, mostly straight and many of them doubled by a parallel line, all over the disk, between the polar seas. With no theory, they were called 'canals.' They were 75–80 m. wide, some of them 3,000 m. long, and the distance between the parallel lines 250–500 m. They are found to be somewhat variable, perhaps owing to the atmospheric conditions of Mars. The observations have been confirmed by some other astronomers. Thus far the phenomena are an unexplained puzzle of extraordinary interest.

The Planetoids.—After Mars in order come the *Planetoids* (q.v.), frequently but improperly called Asteroids.

Jupiter, next in order, is the largest of all the planets, its bulk being more than 1,400 times that of the Earth, though, from its small density, its mass is only 338 times more. After Venus it is brightest of the planets and largest in apparent size, its angular diameter varying from 30″ to 45″. Seen through a telescope, it is seen to be considerably flattened at the poles, from its rapid revolution on its axis; and its surface is crossed in a direction parallel to its equator by three or four distinct and strongly marked belts, and a few others of varying nature. Spots also appear and remain some time on its surface, by means of which its revolution on its axis has been ascertained. This planet is attended by four satellites, easily observable through an ordinary telescope, and which have rendered immense service in determination of longitudes at sea, and of the motion and velocity of light. The satellites, discovered by Galileo, were proved by Sir William Herschel to revolve on their own axes in the same time that they revolve round their primary. The smallest is about the same size as our Moon, the others are considerably larger.

Saturn, next in position, is about 735 times larger in volume than the Earth, though only about 100 times greater in mass. Its apparent diameter when in opposition is 18″, and there is considerable flattening toward the poles. Its surface is traversed by dusky belts much less distinctly marked than those of Jupiter, owing doubtless in great part to its inferior brightness; its general color is dull white or yellowish, but the shaded portions, when seen distinctly, are of glaucous color. The most remarkable peculiarity of Saturn is its ring, or series of concentric rings, each parallel and in the same plane with the others and with the planet's equator; the rings are at present supposed to be three in number: the two outermost are bright like the planet itself, while the innermost is of purplish color, and discernible only through a powerful telescope. The rings are not always visible when Saturn is in the 'opposite' half of its orbit, for when the plane of the rings is intermediate between that of the Earth's orbit and of the ecliptic, their dark surface is turned toward us, and when the sun is in their plane only the narrow edge is illumined; in both these cases the ring is invisible from the Earth. Its plane being inclined at an angle of 28° to the ecliptic, the two surfaces of the ring are seen alternately for periods of 15 years at a time; and at the middle of each period, the rings attain their maximum obliquity to the ecliptic, and are then best seen from the Earth: at the end of each period they become invisible. Saturn has no less than eight satellites, seven of which revolve round it in orbits little removed from the plane of the ring, while the eighth, which is second in size, is considerably inclined to it. Two of the satellites were discovered by Herschel 1787 and 89, four by Cassini 1672 and 84, one by Huyghens 1655, one by Lassell in England and Prof. Bond of Harvard Observatory 1848. The satellites all are outside of the ring, and the largest of them is nearly equal to the planet Mars in size.

Uranus, next in position, was discovered accidentally by the elder Herschel 1781, Mar. 13, and was named 'the Georgium Sidus' and 'Herschel,' which names soon fell into disuse. It is about 96 (some astronomers say 82) times greater than the Earth in volume, and 20 (according to others, 15) times in mass; but though so large, its distance is so much greater in proportion, that astronomers have been unable to gain much information concerning it. No spots or belts have been discovered on its surface; consequently its time of rotation and the position of its axis are unknown It is attended by a number of satellites, but so minute do these bodies appear, that astronomers have been unable to agree as to their exact number; Sir William Herschel reckoned six, while other astronomers believe in the existence of four, five, and eight respectively. That there are at least four is without doubt.

Neptune, next and outermost member of the solar system, nearly 3,000 millions of miles from the centre of the system, slowly performs its revolution round the sun, accomplishing the complete circuit in about 165 solar years. It is about 84 times larger than the Earth, but from its extreme remoteness is of almost inappreciable magnitude when seen through an ordinary telescope. It was the disturbance in the motion of Uranus caused by the attractive force of this planet which led Leverrier and Adams to a calculation of its size and position, on the supposition of its existence; and the directions given by Leverrier to Dr. Galle of Berlin, specifying its exact position in the heavens, led that astronomer to its discovery 1846, Sep. 23. Lassell of Liverpool has discovered that Neptune is attended by one satellite. The satellites of Uranus and Neptune differ from the other planets, primary and secondary, in the direction of their motion, which is from e. to w., and in the case of the former, in planes nearly perpendicular to the ecliptic. Both Uranus and Neptune were observed long before the times of Herschel and Leverrier, but were always supposed to be stars. Uranus is known to have been observed by Flamsteed between 1690 and 1715, and Neptune by Lalande 1795.

In astronomical tables, almanacs, etc., the planets are for convenience denoted by symbols instead of their names.

For a Table of the periods, distances, size, density, etc., of the planets, see SOLAR SYSTEM.

PLANGENT, a. *plăn'jĕnt* [L. *plangens* or *plangen'tem*, striking or beating with a noise—from *plango*, I strike]: dashing or beating, as a wave.

PLANI-, prefix, *plā-nĭ-* [L. *planus*, plain, level, plane]: prefix attaching the qualification of levelness, flatness, or hardness, to the second element of the word.

PLANIMETER, n. *pla-nĭm'ĕ-tėr* [Eng. *plane*, and *meter*]: an instrument for ascertaining the contents of irregular plane figures; a platometer. PLANIMETRY, n. *pla-nĭm'ĕ-trĭ*, the mensuration of plane surfaces. PLANIMETRIC, a. *plăn'ĭ-mĕt'rĭk*, or PLAN'IMET'RICAL, a. *-rĭ-kăl*, pertaining to the mensuration of plane surfaces.

PLANISH, v. *plăn'ĭsh* [L. *plānus*, level, flat]: to polish a metallic surface by gentle and equal blows with a smooth faced hammer; to smooth wood. PLAN'ISHING, imp PLAN'ISHED, pp. *-ĭsht*. PLAN'ISHER, n. *-ėr*, a tool use by turners for smoothing brass-work; a workman wh planishes.

PLANISPHERE, n. *plăn'ĭ-sfēr* [L. *plānus*, flat; Gr *sphaira*, a sphere]: a sphere or globe projected on a plane surface; a map exhibiting the circles of a sphere.

PLANK, n. *plăngk* [F. *planche;* Ger. *planke;* mid. L *planca*, a plank—from Gr. *plax*, anything flat and broad]. a flat piece of sawn timber of some length, differing from boards in being thicker: V. to cover or lay with planks; *familiarly*, to conceal. PLANK'ING, imp.: N. a number of planks. PLANKED, pp. *plăngkt.*

PLANO-: same as PLANI-.

PLANO-CONCAVE, a. *plā'nō-kŏn'kāv* [L. *plānus*, level; *concăvus*, hollowed out]: flat on one side and hollow on the other. PLANO-CONICAL, a. flat on one side and conical on the other. PLANO-CONVEX, a. flat on one side and rounded on the other. PLANO-SUBULATE, a. in *bot.*, smooth and awl-shaped.

PLANOMETER, n. *pla-nŏmĕ'-tėr* [Eng. *plane*, and *meter*]: a trial or plane surface on which articles are tested for straightness and level. It affords a standard gauge for plane surfaces.

PLANOM'ETRY: see PLANIMETRY.

PLANT, n. *plănt* [AS. *plante;* F. *plante*—from L *planta*, a sprout or shoot; *planto*, I set or plant]: organized living body destitute of sensation, and drawing its nourishment from a source exterior to itself (see PLANTS): a sapling a small vegetable; a herb or shrub: in *law* (see below): the tools necessary to any trade; the stock, fixtures, etc., necessary to carry on any large concern, as railway *plant:* V. to put or set in the ground for growth; to set that it may increase, as the germ of anything; to perform the act of planting; to set firmly; to fix; to settle; to colonize; to establish; to fill or adorn with plants. PLANT'ING, imp.: N. the act or operation of putting plants in the soil. PLANT'ED, pp.: ADJ. set; fixed; introduced; settled. PLANTAGE, n. *plănt'āj*, in *OE.*, plants or herbs in general. PLANTATION, n. *plănt-ā'shŭn* [L. *plantatio*, a planting]: in *parts of Europe, etc.*, a portion of land planted with trees for production of timber and small wood (see ARBORICULTURE: FOREST LAWS: TREE: TIMBER TREES): the law concerning plantations in this sense is that, in general, whoever is owner of the soil is entitled to the trees planted in such soil. When land is let by lease to a tenant, the tenant does not become the owner of the trees, and cannot cut them down: see, further, ESTOVER. *Plantation*, in the *W. Indies* and southern *United States*, denotes a large land estate applied to rearing such crops as sugar-cane, coffee, cotton, tobacco, and pepper: new colony or original settlement. PLANT'ABLE, a. *-ă-bl*, capable of being planted. PLANTER, n. *plănt'ėr*, one who plants; one who owns a plantation; one who introduces or disseminates. PLANT'ERSHIP, n. *-shĭp*, the business of a planter; the management of a plantation. PLANT'LET, n. *-lĕt*, a little plant. PLANT'ULE, n. *-ul*, a young plant. PLANT-CANE, the sugar-cane of the first year's growth. PLANT-LOUSE, a small insect infesting plants and feeding on their juices; the Aphis (q.v.) SENSITIVE-PLANT, a plant the leaves of which are highly sensitive whenever touched; a species of *Mĭmōsa*, ord *Lĕgūm'ĭnōsæ.*

PLANT: living organic being, destitute of any indication of mind or feeling, and sometimes defined as essentially differing from an animal in the want of voluntary motion. Plants are the organisms which form the *vegetable kingdom:* the science which treats of them is Botany (q.v.). Plants of higher organization can never be mistaken for animals, nor animals of higher organization for plants. But there is no regular ascending and descending scale of organisms, from the highest animal to the lowest plant; instead we find a widely extended base from which the ascent seems to begin at once in both the organic kingdoms, with many ramifications in each; and in the case of the lowest groups of either kingdom, it is sometimes difficult to discern the difference between plants and animals. The difficulty may be owing to our ignorance and incapacity of proper observation.

Something which resembles the voluntary motion of animals is seen in some plants, in various phenomena of Irritability (q.v.); and there is even locomotion in the vegetable kingdom wonderfully simulating voluntary locomotion, a provision of nature for diffusion of some of the lower vegetable organisms; the *Gonidia* (q.v.) of Algæ and the *Spermatozoïdia* (q.v.) of some other cryptogamous orders moving in a surrounding fluid by means of cilia, so that they have often been mistaken for animalcules. But no motion which can really be deemed voluntary takes place in the vegetable kingdom; and no animal that can certainly be pronounced such fails to exhibit it—even when there is no power whatever of locomotion—in the prehension of food, or for some of the purposes of life.

The general laws which govern life prevail in plants as in animals. There are organs of nutrition and organs of reproduction; the whole being made up of organs, and every organ destined to maintain the existence either of the individual or of the race. But there is nothing in plants corresponding to the mouth, stomach, and alimentary canal of animals. Nutrition takes place in a different manner; assimilation being effected by a process very unlike that of digestion in animals. There are, however, animals destitute of a mouth, stomach, and alimentary canal; so that the distinction between plants and animals cannot be stated so absolutely in this respect as in respect to voluntary motion, and as there are many plants which have no roots, nutrition by means of roots, though peculiar to the vegetable kingdom, is not its distinguishing characteristic. The nutriment of plants is derived either by their roots from the soil (see ROOT), or through the integuments of their other parts from the air or water in which they live; and all their nutriment is either liquid or gaseous, being taken up in the former case by Endosmose (q.v.), and in the latter case through *Stomata* (q.v.). Many plants, among them the greater number of phanerogamous plants, owe their nourishment both to the soil and to the atmosphere, their roots deriving it from the former, and the Leaves (q.v.) of plants that have leaves being the principal organs by which they derive it from the latter. When leaves are wanting, the integument of the parts exposed to the air performs the functions ordinarily assigned to them. Solid matter cannot be appropriated by plants until it has been dissolved in water, or decomposed: see MANURE: SOIL.—The nutriment appropriated by the plant is not assimilated until it has undergone chemical changes, which sometimes take place entirely within the very cell through the integument of which it has entered, some of the lowest kinds of plants consisting altogether of only a single cell; but which, in other plants of higher and more complex organization, depend on a Circulation of the Sap (q.v.), and a very various action of many different organs, each formed of a multitude of cells. These processes are still very imperfectly understood. By them, not only is the plant nourished, but vegetable products of every kind are elaborated, in which, throughout the wide domains of the vegetable kingdom, there is such wonderful variety, and often great diversity in different parts of the same plant.

Whatever the source from which plants derive their nutriment, no organic substance is appropriated by them; but in order to their use, it must first undergo decomposition. With the exception of parasitic plants, which feed on juices not prepared by themselves, the food of plants consists wholly of inorganic matter; and the value of organic substances as manures depends not only on the abundance which they contain of the proper elements, but on the readiness with which they undergo decomposition so as to present these elements in most suitable form; which is not, however, as elements uncombined, but in various combinations with each other. Thus carbon and oxygen enter plants together in the form of carbonic acid, oxygen and hydrogen together in the form of water, hydrogen and nitrogen in the form of ammonia. Carbonic acid absorbed by the leaves from the air is decomposed within the plant, under the influence of light, and particularly of the direct rays of the sun, and its carbon enters into new combinations to form vegetable substances, while its oxygen is exhaled again into the atmosphere, which is thus maintained in a state fit for support of both vegetable and animal life by the opposite and balanced action of animals and plants. Of the elements which enter into the composition of vegetable substances, Carbon is most abundant; and, with it, Oxygen, Hydrogen, and Nitrogen constitute the chief part of every plant. Other elements, both metallic and non-metallic, are found in comparatively small quantity, though some of them are generally present in plants, as Calcium, Potassium, Sodium, Sulphur, Phosphorus, Silicon, Iron, Aluminium, Magnesium, Chlorine, and Iodine. Among the elements found in plants are to be enumerated also Bromine, Manganese, and Copper, which occur only in minute quantities, Copper very rarely.

There is no circulation in plants like that of blood in animals, nor any organ at all analogous to a heart; though there is constant motion or circulation of their juices, both throughout the whole organism and within individual cells. And though the term *respiration* has been often employed with reference to plants, particularly to leaves, yet there is not only no action analogous to that of lungs, but no oxygenation of the juices by being brought into contact with the air; carbonic acid and ammonia—not oxygen—being imbibed from it for nutrition. And there is nothing in the vegetable kingdom having the slightest resemblance to a brain or a nervous system. In the possession of sexual organs, however, there is wonderful agreement, where it might least have been expected, between plants—at least all phanerogamous plants—and animals. As to this and other important points concerning the life of plants, see VEGETABLE PHYSIOLOGY: see also FLOWER: and titles of the different organs of which the flower is composed: the articles FRUIT: SEED: SPORE: CELL THEORY: CELLULAR TISSUE: VASCULAR TISSUE: METAMORPHOSIS OF ORGANS: LEAVES: STEM: ETC. For the great divisions of the vegetable kingdom, see BOTANY, in connection with the subject of classification, and in various separate articles. For the GEOGRAPHICAL DISTRIBUTION OF PLANTS, and the DISEASES OF PLANTS, see those titles.

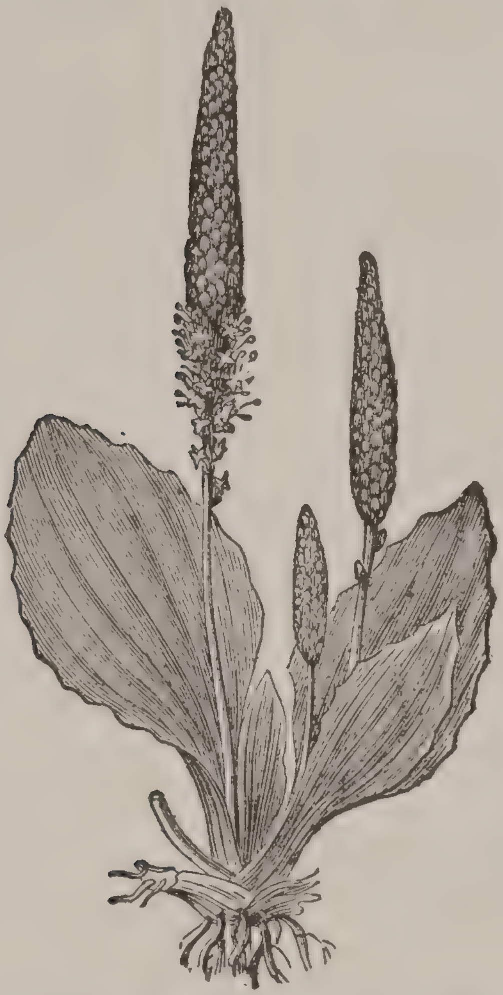
Besides the relations of the animal and vegetable kingdoms above noticed, in their joint and balanced action, keeping the constitution of the atmosphere in fitness for both animal and vegetable life, similar relations subsist in plants and animals as to temperature and as to their mutually providing food for one another. 'It would almost seem as if plants possessed a power of producing cold analogous to that exhibited by animals in producing heat, and of this beneficent arrangement man enjoys the benefit in the luxurious coolness of the fruit which nature lavishes on the tropics' (Sir J. E. Tennent). Flowers indeed produce heat; but the juices of plants are colder than the soil or surrounding atmosphere during the time of active vegetation; and the coolness of groves is owing not only to shade, but to the transpiration of moisture by the innumerable leaves.—Inorganic substances are appropriated by plants as food, and converted by a 'high and mysterious' chemistry into organic substances of many kinds, many of them suitable food for animals, which feed on organic substances alone. But the excrements of animals furnish food for plants; and when animals die, their bodies undergo a series of changes by decomposition, which terminate in the production of the substances most suitable for nourishment of plants. There is, moreover, not only this conversion of the same matter into animal and vegetable substances alternately; but there is also a continual transformation of matter which has remained inorganic throughout long geologic periods into organic substances; and in this some of the lowest kinds of plants are particularly employed, e.g., lichens, which decompose and feed on the very rocks on which they grow; while, on the other hand, the fossil remains of remote periods, and all the products of decomposition, exhibit matter which once formed part of living organisms returned to an inorganic state.

PLANTÆ TRISTES, n. plu. *plăn'tē trĭs'tēz* [L. *plantæ*, plants; *tristis*, sad, melancholy, *tristes*, plu.]: melancholy plants, so named because they expand their flowers in the evening only, as some species of Hesperis, Pelargonium, etc.

PLANTAGENET, *plăn-tăj'ē-nĕt:* surname of the French family of Anjou, which 1154 succeeded to the throne of England on the extinction of the Norman dynasty in the male line, and reigned till 1485, when it was supplanted by the family of TUDOR (q.v.). The name P. belonged originally to the House of Anjou, and is said by antiquarians to have been derived from the circumstance of the first count of this house having caused himself to be scourged with branches of broom (*planta-genista*), as a penance for some crime he had committed. On the extinction of the male line of the Norman dynasty in the person of Henry I., the crown of England was claimed by Stephen, Count of Blois, son of Henry's sister Adela, or Adeliza, and by Henry's own daughter Matilda ('the Empress Maud'), then wife of Geoffrey P., Count of Anjou, for her son Henry Plantagenet. Stephen, by favor of the nobles, was the successful competitor, on the condition that Henry should succeed him; accordingly on Stephen's death, 1154, the son of Geoffrey P. ascended the throne of England as Henry II. His sons Richard I. and John succeeded him, and the descendants of the latter in the direct male line—Henry III., Edward I., Edward II., Edward III., and (Edward III.'s eldest son, the Black Prince, having died before his father, leaving an only son, who as) Richard II.—succeeded without interruption. The eldest male line now became extinct, and it was necessary to choose the rightful heir to the throne from among the descendants of Edward III.'s other sons. His second son had died without heirs, but Lionel, Duke of Clarence; John of Gaunt, Duke of Lancaster; and Edmund Langley, Duke of York, his third, fourth and fifth sons respectively, were still represented by legitimate issue. Of these, Edmund Mortimer, Earl of March, and Anne Mortimer, wife of Richard, Earl of Cambridge (who was eldest son and heir of Edmund Langley, Duke of York), lineal descendants of Lionel of Clarence, possessed the prior claim to the throne; but Edmund was put in prison by Henry IV., the eldest son of John of Gaunt, Duke of Lancaster, who usurped the crown 1399, and transmitted it to his lineal descendants Henry V. and Henry VI. By this time Edmund Mortimer had died without heirs, and the descendants of the marriage of his sister Anne (heiress of Clarence) with Richard, Earl of Cambridge (heir of York), uniting the claims of the *third* and *fifth* sons, had, through their maternal ancestress, a superior claim to the throne over Henry VI. the Lancastrian monarch, who represented only the *fourth* son of Edward III. Richard, Duke of York, son of Richard of Cambridge and Anne Mortimer, attempted to obtain the crown, but he was taken and put to death, leaving to his sons the task of avenging his death, and asserting the claims of the combined house of York and

Clarence to the throne, in which they were ably assisted by Richard Neville, Earl of Warwick (‘the King-maker’). The result was a long and desolating civil war (1455–85) between the partisans of York and Lancaster, which is known in history as the ‘Wars of the Roses’ (the Lancastrians having chosen for their emblem a *red* and the Yorkists a *white* rose), in which more than 100,000 persons perished, and many noble families were either extirpated on the field and the scaffold, or completely ruined. During this dreadful contest, in which the Yorkists generally had the advantage, Edward IV. (eldest son of the Duke of York who had suffered death), his son Edward V., and his brother Richard III. (q.v.) successively swayed the sceptre. But Richard's cruel and tyrannical govt. added new vigor to the reviving Lancastrians, and Henry Tudor (see Henry VII.), representative of their claims, defeated the Yorkist tyrant on the field of Bosworth; and then, by his marriage with Elizabeth, eldest daughter of Edward IV., and representative of the Yorkist claims, reunited in his family the conflicting pretensions to the throne, which he transmitted in peace to his descendants. See Tudor: and for the events of this contest, see Roses, Wars of the.

PLANTAGINEÆ, *plăn-ta-jĭn'ē-ē* or Plantaginaceæ, *plăn-ta-jĭ-nā'sē-ē:* nat. order of exogenous plants, mostly herbaceous and without stems; the leaves forming rosettes, flat and ribbed, or taper and fleshy; the flowers generally in spikes; the calyx 4-parted, persistent; the corolla hypogynous, membranous, persistent, its limb 4-parted; the stamens inserted into the corolla, with long filaments; the ovary free, of a single carpel, 1–4-celled; the fruit, a membranous capsule with a lid. The *testa* of the seeds abounds in mucilage, easily extracted by boiling water. There are about 120 known species, diffused over all parts of the globe, but most abundant in temperate and cold countries. The most important genus is *Plantago*, the species of which often receive the English name Plantain, *plănt'ăn* [F. *plantain*—from L. *plantāgo*, or *plantag'inem*, a plantain]. Of this genus are the following: Common Plantain (*P. major*), a perennial with broad, ovate stalked leaves and long cylindrical crowded spikes, common in pastures, waysides, etc. It is very widely diffused over the world. Its seeds are a favorite food of birds, and the gathering of the spikes to feed cage-birds is familiar. The leaves are applied to wounds in domestic medicine in many districts. They are said also to be a useful application to ulcers and indolent scrofulous tumors.—The Ribwort Plantain, or Ribgrass (*P. lanceolata*), common in the e. United States, and in some countries occasionally sown by farmers because its foliage is produced early in the season, and is then acceptable to oxen, sheep, and horses; but deemed most suitable for poor soils, as its spreading leaves occupy too much ground, and choke better grasses in rich land. Its leaves are lanceolate, and taper at both ends; its spikes are short, ovate or cylindrical, and placed on long, angular stalks. Its seed is acceptable to cage-birds. Besides these, naturalized from Europe, we have many native species and varieties: the few-flowered *sparsiflora*, w. and s.; the heart-leaved *cordata*, rare; the *maritima*, leaves ribless, in salt-marshes, n.; the more or less diœcious *Virginica* (4 stamens), and the 2-stamened *pusilla* (pod 4-seeded), and *heterophylla;* also the silky-woolly *Patagonica*, N. and S. Amer.—The mucilage of the seeds of *Plantago ispaghula*



Greater Plantain (*Plantago major*).

and of *P. psyllium* is much used in India in catarrhs and other complaints; and *P. psyllium*—called FLEAWORT, and its seeds FLEASEED—is cultivated in France for this mucilage, which is used by paper-stainers in preference to that from linseed, also by muslin manufacturers for stiffening their goods. The plant has a branched spreading stem, and recurved leaves.

PLANTAIN, or PLANTAIN-TREE [Sp. *platano:* F. *plantain*]. (*Musa Paradisaica*): a most important food-plant of tropical countries, and one of the largest of herbaceous plants; of nat. order *Musaceæ* (q.v.); native of the E. Indies, where numberless varieties of it have been cultivated for thousands of years. It is now diffused over all tropical and subtropical regions of the globe. It must have been carried to America soon after or during the time of Columbus, for its fruit was a principal article of food there in the first half of the 16th c.; but there is nothing to support the conjecture of Humboldt that there may be different species cultivated under the name P., and some of them natives of America. The P. is now, however, cultivated to the furthest depths of the primeval Southern American forests, is carried by the natives in their frequent changes of residence, forms the wealth of many occupiers of land in the vicinity of great towns, where large plantations of it are made, and is a true staff of life to the population of all colors and classes in tropical countries. In many regions it is the principal article of food.

In the genus *Musa* there arise from the midst of the leaves—or apparently from the top of the stem, the sheathing bases of the leaves forming a tree-like false stem—stalks which bear great spikes of flowers, each inclosed in a large bract or spathe; the flowers, and afterward the fruit, are arranged in clusters or almost in whorls on the stalk; the flowers have a perianth of six segments, five of which cohere as a tube slit at the back, and the sixth is small and concave; there are six stamens, one or more of them imperfect; the germen is inferior, 3-celled, with two rows of ovules in each cell; the fruit is fleshy, and has many seeds imbedded in its pulp. The name *Musa* is from the Arabic *moz*, a plantain; the P. seems to be described by Pliny under the name *pala*, a name probably derived from an eastern root, from which comes also the name *plantain*. The specific name *Paradisaica* alludes either to a fancy that the P. was the forbidden fruit of Eden, or to a legend that the aprons which our first parents made for themselves were of P. leaves.

The stem of the P. is usually 15 or 20 ft. high, though there are varieties having a stem of only 6 ft. The leaves are very large, the blade being sometimes 10 ft. long and 3 ft. broad, undivided, of beautiful shining green; the midrib strong and fleshy. The fruit is oblong, varying from its usual long shape to an almost spherical one, obscurely angular, 8 to 12 inches long in the varieties commonly known by the name P., of which the fruit is usually cooked or prepared in some way in order to be eaten, and very often forms a substitute for bread; while the smaller-fruited varieties, of which the fruit is eaten raw, are generally known by the name Banana (q.v.); these names, however, being somewhat variously used.

The P. is generally propagated by suckers; and a sucker attains maturity in about eight months or a year after being planted. The stem is cut down after fruiting, but the plantation does not require renewal for 15 or 20 years.

Plantains ought to be at least 10 ft. apart in plantations of them, or 6 ft. in single rows around fields or gardens. The P. has been sometimes cultivated with success in hothouses.

With the exception of two or three palms, it would not be easy to name, in the whole vegetable kingdom, any plant applied to a greater number of uses than the plantain. The fruit is eaten sometimes raw, though more generally —except that of the Banana (q.v.)—boiled or roasted, and variously prepared. It is both farinaceous and saccharine. In most of the varieties it has a sweetish taste; in some it is mealy; in some it is subacid or austere. It is as much used before being perfectly ripe as when it is so. In the W. Indies the P. boiled and beaten in a mortar is a common food of the negroes. Plantains baked in their skins, or fried in slices with butter and powdered over with sugar, are favorite dishes in some tropical countries. They are preserved by drying in the sun or in ovens, and pressed into masses, in which state they keep for years, and furnish wholesome food. The unripe fruit, peeled, sliced, dried, and powdered, is called *P. meal,* and in Guiana *Conquin tay;* it is whitish with dark-red specks, a fragrance like orris-root, and a taste like wheat-flour; and is made into excellent and nourishing dishes. A good and wholesome starch is obtained from the P. by rasping and washing.—A decoction of the fruit is a common beverage; and a kind of wine is obtained from it by fermentation.—The top of the stalk is a good boiled vegetable.—The leaves are much used for packing, and many other purposes; the fibre of their stalks is used for textile purposes and for cordage; and it is probable that it might be used for paper-making; but hitherto the leaves and stems of plantains have been generally burned or left to rot.

So great is the food product of the P., that, according to Humboldt's calculation, it is to that of the potato as 44 to 1, and to that of wheat as 133 to 1. The culture requires little attention.

The name P. is frequently extended to the whole genus *Musa.* Wild species, with austere fruit, are found in many parts of the East. One is found on the Himalayas at an elevation of 6,500 ft. A species in the South Sea Islands (*M. troglodytarum*) is remarkable for bearing its clusters of fruit erect, not pendent like the other species. Its fruit is eatable, as is that of *M. Cavendishii* and of *M. Chinensis,* species or varieties smaller than the common plantain.—The *Musa* extensively cultivated in the Philippine Islands for its fibre, *Abaca* or *Manilla Hemp,* is similar to the common P., but has a green, hard, and austere fruit. It is generally cut when about a year and a half old, before flowering. The outer layers of the stem yield the coarsest fibre; that of the inner is so fine that a garment made of it may be inclosed in the hollow of the hand.—The young stems of *M. Ensete,* the ENSETE of Abyssinia, are used in that country as a boiled esculent.

PLANT′AIN-EAT′ER (*Musophaga*): genus of birds of family *Musophagidæ*, to the whole of which the same English name is often extended. The *Musophagidæ* are tropical birds, African and S. American, of order *Insessores*, and tribe *Conirostres*, allied to finches, but many of them large, and more like gallinaceous birds than finches. They are birds of beautiful plumage. They have strong thick bills, more or less curved on the top, the cutting edges jagged, or finely serrated, so as to render them very efficient instruments for cutting soft vegetable substances on which they feed, as the plantain and other fruits, and for dividing the succulent stems of plants which they cut off close to the ground. They live much among boughs of trees, and are active and wary birds. The true plantain-eaters (*Musophaga*) have the base of the bill extending upon the forehead; the TOURACOS (*Corythaix*) have a smaller bill, and the head crested.

PLANTAR, a. *plănt′ăr* [L. *planta*, the sole of the foot]: pertaining to the sole of the foot.

PLANTER, PLANTLET, PLANTULE, etc.: see under PLANT.

PLANTIGRADE, a. *plăn-tĭ-grād* [L. *planta*, the sole of the foot; *grădus*, a step]: walking on the whole sole of the foot, as a bear: N. an animal that does so. PLAN′TIGRA′DA, *-gră′da*, in Cuvier's zoological system, a tribe of *Carnivora* (q.v.), characterized by placing the whole sole of the foot on the ground in walking. The sole is generally destitute of hair. Both fore and hind feet are five-toed in all the plantigrada. The P. are generally more or less nocturnal in their mode of life, and their movements are slower and their gait more clumsy than those of the *Digitigrada*. They are also, in general, less carnivorous; many feed in part or occasionally on vegetable food. The conformation of their limbs and feet gives them a power of standing erect on their hind-feet, which none of the *Digitigrada* naturally possess, and of which advantage is taken in tame bears for the amusement of spectators.

Plantigrade Foot.

PLANTIN, *plŏng-tăng′*, CHRISTOPHE: eminent printer: 1514–89; b. St. Avertin, near Tours, France. He set up a printing-establishment at Antwerp 1549, which soon became the greatest and most celebrated of the time. He had often 20 presses or more in operation. Later he had establishments in Leyden and Paris also. Guicciardini mentions his printing-establishment as the finest ornament of Antwerp, and as one of the wonders of Europe, and the learned agreed in regarding him as the first printer of his time, though he was contemporary of Aldus and Estienne (Stephens); but this is true only as regards number of works, and beauty of their typography; for the services which the others have rendered to classic literature are far beyond those of P. He was nevertheless a man of varied, though probably not profound learning. He superintended the publication of works in several languages, and was extremely careful of their accuracy, employing able and learned correctors of the press, whom he remunerated liberally, and publicly offering rewards for the discovery of errors. The most noted of all his publications is the *Biblia Polyglotta* (8 vols. 1569–73), printed under personal superintendence of the learned Arias Montanus, court chaplain of Philip II. of Spain. P. died at Antwerp. His office in Antwerp was bought by the city 1876 for 1,200,000 francs; when out of it was created the 'Musée Plantin,' opened 1877, Aug. 19.

PLANTS, in Law: property of the landlord and not of the tenant, when put into a garden or other ground let to a tenant. The tenant cannot dig them up and remove them, at the termination of his lease. Yet the tenant may alter and remove the plants at discretion during his lease, and thus can evade the rule of law. In the case of nursery grounds, however, the above rule does not apply as between landlord and tenant; for the plants are considered the stock-in-trade of the nurseryman, who puts them in the ground not with a view to let them grow permanently, but as a convenient mode of keeping them for sale; and at the termination of his lease can remove them.

PLANU'DES, MAXIMUS: see ANTHOLOGY.

PLANULA, n. *plan'ū-lă* [L. *plān'ŭla*, a little plane—from *plānus*, flat]: the oval ciliated embryo of certain of the Hydrozoa.

PLANXTY, n, *plănks'tĭ:* a well-known dance among the Irish.

PLAQUE, n. *plăk* [F.]: a plate; a thin slab of wood used in cabinet-making; a veneer; an ornamental plate of china or other ware upon which pictures are painted; a brooch; the plate of a clasp; a flat plate of metal upon which enamels are painted; hence, the word is applied to the small enamels themselves, done at Limoges in the 15th century.

PLASENCIA, *plâ-sĕn'thē-â:* ancient and much-decayed, but picturesque town of Spain, in Estremadura, 43 m. n.n.e. of Caceres; on a steep hill, with beautiful and fertile valleys, extending on the n.w. and s.e. sides. It is almost wholly girdled by the clear waters of the Jerte; and the surrounding scenery, embracing city, castle, river, rock, and mountain, and overarched by a sunny and unclouded sky, is remarkably beautiful. The city contains the picturesque remains of an ancient castle, and is surrounded by crumbling walls, surmounted by 68 towers, and pierced by six gates. Water is brought to the town by an aqueduct of 80 arches. There are seven Gothic churches, an episcopal and several other palaces, besides the cathedral, an ornate Gothic edifice, begun 1498, some portions of which are still unfinished, and others have been altered and disfigured. The cathedral contains many noble tombs, with effigies. P., formerly flourishing and important city was founded 1190. Pop. (1877) 7,090; (1887) 8,044.

PLASH, n. *plăsh* [Ger. *platschen*, to plash: Dut. *plasschen;* Sw. *plaska*, to paddle, to splash: Gael. *plais*, to splash]: a little pond or puddle: V. to dabble in water; to make a noise by disturbing water. PLASH'ING, imp. PLASHED, pp. *plăsht*. PLASHY, a. *plăsh'ĭ*, abounding with puddles.

PLASH, n. *plăsh* [OF. *plesser*, to fold or plait young branches to thicken a hedge—from mid. L. *plessa*, a thicket of interwoven boughs—from L. *plexus*, twisted]: a small branch slightly cut and twisted among other branches to thicken a hedge: V. to entwine or unite branches; to splice. PLASH'ING, imp. PLASHED, pp. *plăsht*. See also PLEACH.

PLASMA, n. *plăz'mă* [Gr. *plasma*, a thing molded or formed, an image or model—from *plassō*, I mold]: a silicious mineral, a variety of quartz or chalcedony, of dark-green color, black when unpolished and seen by reflected light, but very translucent when held between the eye and the light. It is very nearly allied to heliotrope or bloodstone, but has no red spots, is more translucent, and is not susceptible of so brillant a polish. It is never found crystallized. It is rare, and the finest specimens are from India and China. It was highly prized by the ancient Romans, who wrought it into ornaments of various kinds; and very fine engraved specimens have been found among the ruins of ancient Rome. The ancients are said to have obtained their plasma from Mount Olympus in Asia Minor. The name P. is supposed identical with the Greek *prason*, a leek, the *r* having passed into *l*.—In *physiol*, the term P. is applied to the colorless fluid part of the blood in which the corpuscles float. PLASM, n. *plăzm*, mold or matrix.

PLASMIN, n. *plăz'mĭn* [Eng. *plasma*]: in *chem.*, a constituent of the blood to which is attributed the property of spontaneous coagulation. It is soluble in water, and is deposited in flocks from its solution in sulphate of sodium by saturation with chloride of sodium. When heated to 100° it becomes insoluble in water, and when dissolved in 20 parts of water, it soon solidifies to a colorless jelly.

PLASMODIUM, n. *plăz-mō'dĭ-ŭm* [Gr. *plasma*, a thing molded or formed; *eidos*, resemblance]: in *bot.*, a protoplasmic body formed by the coalescence of swarm spores in myxosporous fungi.

PLASMOGONY, n. *plăz-mŏg'o-nĭ* [Eng. *plasma;* Gr. *gonē*, off-spring]: in *biol.*, the generation of an organism from a plasma.

PLASSEY, *plâs'sē* (*Palási*): battlefield on the Bhágirathi river, 96 m. n. of Calcutta. The river has now washed away the scene of the struggle. P. is celebrated in the history of India for the great victory gained by Clive (q v.) over Suraja Dowlah. subahdar of Bengal, 1757, June 23, a victory which laid the foundation of British supremacy in India. The British force at the battle of P. consisted of 1.000 British troops and 2,000 sepoys. The subahdar's force consisted of 15,000 cavalry and 35,000 infantry, with 40 French artillerymen, and 50 large cannon.

PLASTER, n. *plâs'tėr* [AS. *plaster;* Dut. *pleistre;* F. *plâtre;* OF. *plastre,* plaster—from mid. L. *plastrum*—from Gr. *plassō,* I form or mold: Sp. *plasta,* soft clay; *plaste,* fine paste: Gael. *plasd,* to plaster]: composition of lime, water, and sand for coating walls and ceilings; a material, calcined gypsum, of which moldings, casts, etc., are formed; adhesive medicinal substance spread on leather or cloth for applying to sores or wounds (see PLASTERS): V. to overlay with plaster; to cover with plaster, as a wound; to smooth over; to cover over, or conceal defects: ADJ. made or consisting of plaster. PLAS'TERING, imp.: N. the plaster-work of a building (see below). PLAS'TERED, pp. *-tėrd.* PLAS'TERER, n. *-tėr-ėr,* one who works in plaster. PLASTER-STONE, gypsum, or stucco-stone. PLASTER OF PARIS, cement or plaster obtained by calcining gypsum or sulphate of lime, so called from its having been prepared first near Paris; it is usually sold in the form of a white powder, and largely employed in the arts: see GYPSUM.

PLAS'TERING: art of covering walls, partitions, ceilings, etc., with a composition of lime mixed with sand and hair. It is done usually in three coats. The first coat is the solid foundation on which the rest is placed; it is therefore of good thickness, and is hatched or crossed with lines to give a bond for the next coat. The first coat is allowed to dry thoroughly; the second coat is floated over the first, and rubbed well in with a flat board, about 12 inches square, to bring it all to a fair and equal surface; and before the second coat has thoroughly dried, the third or finishing coat is applied in finer materials and more liquid state. In ceiling cornices, moldings, etc., plaster of Paris or stucco is generally used: this sets or hardens more rapidly than lime, and has a finer and whiter surface. Ornaments (called enrichments) are generally of plaster of Paris, and cast in molds. They are then set in their places after the cornice has been made, or *run.*

PLAS'TERS: class of medicinal agents employed externally with various objects. They are solid and tenacious compounds, adhesive at the ordinary temperature of the body, and owing their consistency—1, To the chemical combination of oxide of lead, with one or more fatty acids; or 2, to due admixture of wax, or fat. and resin; or 3, to the chemical action of the component parts of the plaster on each other. Strictly, the term *Plaster* should be restricted to the first class of compounds; viz., to combination of oxide of lead with fatty acids. Among plasters in more or less common use are: ammoniac and mercury plaster, Belladonna plaster, cantharides plaster, chalybeate plaster, galbanum plaster, litharge (or lead) plaster, mercurial plaster, opium plaster, pitch plaster, resin plaster, soap plaster, and warm plaster. The litharge (or lead) plaster directly or indirectly enters into the composition of those mentioned, except those of ammoniac and mercury, cantharides, and pitch. *Lead Plaster,* usually sold under the name *Diachylon,* in combination with resin, constitutes the ordinary *adhesive plaster.* The best plaster of this kind for strapping is composed of a mixture of six drachms of resin with a pound of lead plaster. The *cantharides plaster* and the *ammoniac and mercury plaster* are examples of the second and third varieties.

Plasters are kept generally in rolls; and when they are to be used, they are melted at a temperature of not more than 212°, and spread on soft leather. They are employed to answer two distinct indications; namely, to act *mechanically*, as by affording artificial support to weak muscular structures, by preventing threatened or tedious excoriations, by protecting parts already excoriated from the action of the air, etc.; and to act *medicinally* as stimulant, discutient, alterative, anodyne, etc.

PLASTIC, a. *plăs′tĭk* [F. *plastique*, plastic: L. *plasticus;* Gr. *plastikos*, suitable for being fashioned or formed—from *plassō*, I form or mold]: susceptible of being molded or modelled, as clay; having power to give form to matter; pertaining to modelling; produced by, or appearing as produced by, molding or modelling. PLASTICITY, n. *plăs-tĭs′ĭ-tĭ* [F. *plasticité*]: capacity of being molded. PLASTIC ART, the art of representing figures in sculpture, or by modelling in clay. PLASTIC CLAY, the clay used by potters. PLASTOGRAPHY, n. *plăs-tŏg′ră-fĭ* [Gr. *graphē*, a picture]: the art of forming figures, etc., in plaster. PLASTIC ELEMENT, an element which contains the germ of a higher form. PLASTIC FORCE, the force which gives to matter a definite organic form.

PLASTRON, n. *plăs′trŏn* [F. *plastron*, a breastplate—from It. *piastrone*]: a piece of stuffed leather or other substance used by fencers as a protection to the body against thrusts; that part of the bony covering of turtles and tortoises belonging to the under surface; a variously shaped ornament for the front of a lady's dress, of a different material from the dress itself. PLASTRON DE FER, n. *dė fėr*, in *old armor*, an iron breastplate, worn beneath the knight's hauberk as an additional protection, as well as to prevent the friction or pressure of the ringed plates.

PLAT, n. *plăt* [from PLAIT, which see]: straw-plait; a braid: V. to weave; to form by intertexture. PLAT′TING, imp. PLAT′TED, pp. PLAT′TER, n. *-ėr*, one who plats.

PLAT, n. *plăt* [Ger. *platz*, an open space; Dut. *plot;* F. *plat;* Gr. *plătus*, broad, flat: Bav. *platten*, a bare spot in a wood]: a small piece of flat or even ground; in *masonry*, a broad flat stone forming a step or landing-place before a door: ADJ. flat or even. PLAT′BAND, a border of flowers in a garden; in *arch.*, a flat rectangular molding whose projection is less than its breadth.

PLATA, n. *plâ′ta* [Sp.]: silver. PLATA-AZUL, n. *-a-thûl′*, in *mineral.*, Mexican name for a rich ore of silver.

PLA′TA, LA: see ARGENTINE REPUBLIC.

PLATA, *plâ′tâ*, RIO DE LA, or PLATE RIVER: wide estuary of S. America, between Uruguay on the n. and the Argentine Confederation on the s.; forming the mouth of the Parana (q.v.) and the Uruguay (q.v.). It is 200 m. long, 29 m. broad at Buenos Ayres, and 140 m. broad at its mouth between Maldonado and Cape San Antonio. At its mouth it is, on an average, only about 10 fathoms deep; at Monte Video it is only 3 fathoms; and at Buenos Ayres about 16 ft. deep. Some conception of the vast volume of water which this estuary carries to the Atlantic may be had when it is remembered that with its affluents it drains an area of 1,250,000 sq. m. The strong and irregular currents, and the sudden tempests of the La P., render its navigation extremely dangerous. It is estimated that through this estuary about one-fourth of the produce of South America is brought to market. For the navigation of its affluents, see PARAGUAY: PARANA: URUGUAY.

PLATÆA, *plâ-tē'a*, or PLATÆÆ, *plâ-tē'ē:* city in the w. part of Bœotia, on the borders of Attica, at the foot of Mount Cithæron. It was about 6½ m. from Thebes. B.C. 480 it was destroyed by the Persians, because the inhabitants had taken part with Athens in the battle of Marathon; but in the following year it was the scene of the glorious victory won by the Lacedæmonian Greeks, under Pausanias and Aristides, over the Persian hordes commanded by Mardonius—a victory that finally delivered Greece from the threatened yoke of the invader. In the third year of the Peloponnesian war, B.C. 429, it was attacked by a Theban-Lacedæmonian force—for the Platæans were firm friends of Athens—and heroically defended itself more than two years, until it was starved into surrender. The little garrison of about 200 men were put to the sword, and the city was razed to the ground. Such of the Platæans as escaped were hospitably received at Athens. By the treaty of Antalcidas B.C. 387, their children were allowed to go back again, and rebuild their city, after an exile of 40 years; but they were again driven out by their implacable enemies, the Thebans; and half a century elapsed before the victory of Philip of Macedon at Chæroneia enabled the Platæans finally to return to their homes. After this, the city remained inhabited, probably till the latest days of the empire. It is mentioned in the 6th c. after Christ. Some ruins of P. are still visible near the village of *Kokhla*.

PLATA'LEA: see SPOONBILL.

PLATANE, n. *plăt'ān* [L. *platănus*, the plane-tree]: the plane-tree, which see.

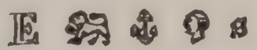
PLATE, n. *plāt* [F. *plat*, flat, plain: Ger. *platte*, a plate: Gr. *plătus*, flat, level]: a body with a flat and extended surface; a dish; a flat shallow vessel of earthenware, etc., used at table for eating from; a sheet of metal; an engraved flat piece of metal, or the engraving printed from it; articles for domestic use in gold or silver [Sp. *plata*, silver—name originally given to the thin plates of silver worked by silversmiths, then to the metal itself]: a prize at a race, as the 'queen's plate'; a mining term for compact beds of shale which break up into thin plates; in *arch.*, the piece of timber which supports the ends of the rafters: in *her.*, a Roundel (q.v.) argent. It is represented flat, and in the heraldry of Scotland is known as a *Bezant argent:* V. to coat with a more valuable metal, as copper with silver; to overlay or cover. Plat′ing, imp.: N. the act or art of covering with a thin coat of a more valuable metal, usually silver; the coating or layer so formed (see below). Plat′ed, pp.: Adj. covered with a coating of metal, as silver, covered or armed with sheets of metal. Plat′er, n. *-ĕr*, one who plates. Plat′y, a. *-ĭ*, like plate. Plateful, n. *plāt′fûl*, enough to fill a plate; as much as a plate can contain. Platter, n. *plăt′tĕr*, a large flat dish for holding the provisions of a table. Plate-armor, armor in plates, as distinguished from mail. Armor-plating, the thick plates or slabs of rolled iron which form the sides of a man-of-war. Plate-girder, a girder formed of a single plate of metal, or of a series of plates joined together. Plate-glass, glass cast into plates or sheets when in a liquid state, and ground and polished. Plate-layer, a workman who lays down and fixes the rails of a railway, and keeps them in order. Plate-mark, figure or emblematic design stamped on gold or silver plate to indicate the value of its metal, etc. (see Plate-marks). Plate-paper, a thick spongy paper manufactured for printing from engraved plates. Plate-rack, a wooden frame or stand for plates and dishes in a kitchen or scullery. Plate-warmer, a metal case with shelves for warming plates before a fire.

PLATE River: see Plata, Rio de la.

PLATEAU, n. *plă-tō′*, plu. Plateaux′, *-tōz′* [F. *plateau*, table-land; *plat*, flat]: any elevated and comparatively flat surface of land of some extent; a table-land, or high level region.

PLATE′-MARKS: legal impressions made on articles of gold or silver at the various assay offices in Great Britain, for indicating the true value of the metal of which the articles are made: see Assay: Goldsmiths' Company. There is no such legal usage in the United States.—The marks are a series of symbols, embossed in a line about three-quarters of an inch in length, and usually on every separate piece of which an article is composed. These symbols are—1. The maker's own mark or initials. 2. The standard or assay mark; viz., *for gold*, a crown, and figures denoting the number of carats fine. This means that pure gold is reckoned at 24 carats, and every part of alloy added reduces that standard number (see Carat); so that if a piece of gold-plate or jewelry is marked with a crown and 18, it indicates that it consists of 18 parts of pure gold, and 6 parts of some other metal alloyed with it. Gold of nine carats is now legal in Britain, but as it is marked by the assay office, there can be no deception, if the public understand the plate-marks. If not, they may pay for pure gold, relying on the hall-mark, when they receive only about a third part gold. *For Silver*—England, a lion passant; Ireland, a harp crowned; Edinburgh, a thistle; Glasgow, a lion rampant. 3. The hall-mark of the district office—London, a leopard's head crowned; York, three lions and a cross; Exeter, a castle with two wings; Chester, three wheat-sheaves or a dagger; Newcastle, three castles; Birmingham, an anchor; Sheffield, a crown; Edinburgh, a castle and lion; Glasgow, a tree, sal mon, and ring; Dublin, the figure of Hibernia. 4. The duty-mark, indicating the payment of duty, viz., the head of the reigning sovereign. 5. Each office has also its alphabetical date-mark. In London, the assay year, which commences May 30, is indicated by one of the first 20 letters of the alphabet. The Goldsmiths' Company of London have marked thus:

1716 to 1756, Roman Capital Letters.
1756 " 1776, Roman Small Letters.
1776 " 1796, Old English Letters.
1796 " 1816, Roman Capital Letters **A** to **U**.
1816 " 1836, Roman Small Letters **a** to **u**.
1836 " 1856, Old English Letters **𝕬** to **𝖀**.
1856 " 1876, Small Black Letters **𝖆** to **𝖚**.
1876 onward, Roman Capitals, distinguished from former series by shape of shield on which they are imprinted.

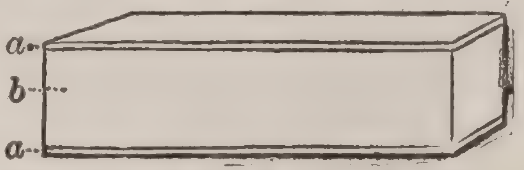
Thus,  would represent the mark on Elkington's plate, made 1874.

PLATEN, n. *plăt′ĕn* [Ger. *platte;* Dut. *plat;* F. *plat*, broad, flat]: among *printers*, the flat part of a press by which the impression is made.

PLATE′-POWDER: composition for cleaning gold and silver plate and plated articles; called also Rouge-powder (see ROUGE). It is made by levigating rouge with three times its weight of prepared chalk, until they are thoroughly mixed into an almost impalpable powder. Sometimes Putty-powder (q.v.) is used instead of rouge, and a little rose-pink added to color it. A plate-powder is made sometimes also by levigating quicksilver with 12 times its weight of prepared chalk, until it is thoroughly incorporated, and forms a gray powder. It puts a remarkable brilliancy on silver-plate, but is very injurious to it.

PLATFORM, n. *plăt′fawrm* [F. *plate forme;* It. *piattaforma;* Dut. *platte-forme;* L. *planus*, and *forma:* Eng. *plat*, and *form*]: in *OE.*, a terrace; a scheme; a plan; a raised level space, natural or artificial; any level scaffold or floor of timber raised above the usual level; the flat roof of a building on the outside; the place where guns are mounted on a fortress or battery; the raised part at a railway station for landing passengers and goods; the place set aside for the speakers at a public meeting, raised above the floor; in America, a plan or scheme of united action, as in politics, or for subserving party or sectarian purposes; a declaration of principles to which the adhesion of a party is declared—each principle or proposal forming a *plank* in the *platform*.

PLAT′ING: covering an inferior metal with one of the precious metals, the object being to give the appearance of silver or gold to articles intended chiefly for table use. At present, the articles are generally of German silver or some of the similar white-metal alloys; but formerly, copper, or an alloy of that metal with brass, was used; the disadvantage of which was that, as the coating of silver wore off, the red color of the copper became disagreeably apparent through the thin covering of silver. Gold is plated rarely on any other metal than silver, except for purposes of deception. Previous to the introduction of electro-plating, the usual method was that named *Sheffield-plating,* from the extent to which it was carried on in that town. It consists in soldering on to one or both sides of an ingot of the baser metal, a thin plate of silver. The ingot is always oblong shape, and is most carefully prepared on the surfaces which are to receive the silver, so that nothing shall prevent the complete union of the two. The shape and relative proportions of the ingot, and its plating of silver, are seen in the figure: *aa* is the silver on the upper and lower surfaces, for double-plated goods; *b*, the body of the ingot, of copper or white-metal alloy. The soldering is a process requiring much care and nicety: the plates of silver are thinly coated with a concentrated solution of borax, and are then applied to the prepared surfaces of the ingot, to which they are firmly bound with iron wire, and then placed in the *plating-furnace*, and subjected to a strong heat. This furnace is so arranged that the interior can be constantly watched, and when the proper temperature is attained, the workman knows the exact instant to withdraw it. The act of soldering is almost instantaneous, and fusion would immediately follow, if the ingot was not quickly withdrawn. When cooled, the wire is taken off, and the ingot is taken to the rolling-mill, where it is passed forward and backward, of course with the silver above and below, until it is rolled out into a sheet of the exact thickness required. However thin it may be made, it is found that the relative thickness between the ingot and its layers of silver is always the same. As usual, in all cases of rolling or striking metal, annealing from time to time is necessary, to remove the brittleness which these operations cause. This method does not admit manufacture of any portions such as ornamental molded borders, etc.; these had therefore to be formed separately of copper, and were coated by the process called *Silvering* (q.v.). Now, however, it is found better to make them of silver rolled thin, and fill them inside with lead, to give them solidity; by this plan is avoided the annoyance of the silver rubbing off, and exposing the copper Sheffield-plating is still made extensively, but the manufacture is rapidly declining in presence of the newer art of electro-plating; in which by remarkable processes discovered in recent years, the deposit is made not only of silver and gold, but also of aluminium, silicium, titanium, tungsten, molybdenum, tin, cadmium, lead, bismuth, palladium, rhodium, iridium, and the alloys brass and bronze. The plating with the alloys is far the most important—e.g., the covering such a material as cast-iron with a material so ornamental as bronze. See ELECTRICITY.



PLATINUM, n. *plăt′ĭ-nŭm*, or **Plat′ina**, n. *-nă* [Sp. *platina*, platinum—from *plata*, silver, in allusion to its color]: metal of grayish-white color, very valuable for hardness, infusibility, and its resistance to the action of air and moisture—it is also ductile, malleable, of great tenacity, and one of the heaviest of known metals (see below). **Platinize**, v. *plăt′ĭ-nīz*, to coat or plate with platinum. **Plat′inizing**, imp. **Plat′inized**, pp. *-nīzd*. **Platinum-black**, metallic platinum in a finely divided state. **Platiniferous**, a. *plăt′ĭn-ĭf′ėr-ŭs* [L. *fero*, I produce]: producing platina. **Platinoids**, n. plu. *plàt′ĭn-oydz* [Gr. *eidos*, appearance]: a term applied to those metals found associated with platina.—*Platinum* (symb. Pt., at. wt. 195, sp. gr. 21·5) is one of the 'noble metals' which may be obtained in more forms than one. It is found only in the native state, usually in small glistening granules of steel-gray color, which always contain an admixture, in varying proportions, of several metals, most of which are rarely found, except in association with P.: hence the epithet applied to this metal—*polyscene*, 'hospitable,' or having many guests. Sometimes, however, it is found in masses of the size of a pigeon's egg, and pieces weighing 10 or even 20 lbs. have occasionally been found. The following table shows the composition of crude P. ore as obtained from different parts of the globe. (Analyses conducted by Deville and Debray.)

	Columbia.	California.	Oregon.	Spain.	Australia.	Russia.
Platinum, . . .	80·00	79·85	51·45	45·70	59·80	77·50
Iridium,. . . .	1·55	4·20	0·40	0·95	2·20	1·45
Rhodium, . . .	2·50	0·65	0·65	2·65	1·50	2·80
Palladium, . . .	1·00	1·95	0·15	0·85	1·50	0·85
Gold, ...	1·50	0·55	0·85	3·15	2·40	....
Copper, ...	0·65	0·75	2·15	1·05	1·10	2·15
Iron, ...	7·20	4·45	4·30	6·80	4·30	9·60
Osmide of Iridium	1·40	4·95	37·30	2·85	25·00	2·35
Sand, ...	4·35	2·60	3·00	35·95	1·20	1·00
Osmium and loss,	....	0·05	....	0·05	0·80	2·30

Ruthenium is also almost always present, and in the above analyses is probably included with the iridium, which it closely resembles.

There are two modes of obtaining P. in the form of ingots from the ore. The method formerly employed was that of Wollaston, the chief steps of which were as follows: After removal of the metals associated with the P., by the successive action of nitric and hydrochloric acids, the P. itself was dissolved in aqua regia, from which it was precipitated by a solution of sal ammoniac in the form of a sparingly soluble double salt, ammonium platinochloride, $Pt.Cl_6(NH_4)_2$. This salt was washed and heated to redness, by which means the chlorine and ammonia were expelled, leaving the metal in the form of a gray, spongy, soft mass, known to chemists as *spongy platinum*. In this form P. cannot be fused into a compact mass by ordinary furnace heat, but, like iron, it can be welded at a high temperature. Accordingly it was made into a thin paste with water, then introduced into a brass mold, and subjected to a graduated pressure, by which the water was squeezed out, and the mass rendered sufficiently firm to bear handling. It was then dried, very carefully heated to whiteness, and hammered or subjected to powerful pressure. If this operation is properly conducted, the P. will bear forging into a bar, which can afterward be rolled into plates, or drawn into wire.

The welding process is now superseded by the method proposed by the two French chemists, Deville and Debray, 1859. Their furnace is very simple. Two flat pieces of quicklime, scooped out so as to represent two cupels, form the bottom and the lid of the furnace. The lower cupel has a notch cut in its side to serve as an exit for the liquefied P ; the upper one is pierced at its centre with a slightly conical round hole through which the (platinum) nozzle of an oxyhydrogen blow-pipe enters, so that the flame beats down on the metal within.

P., as obtained by either of the above processes, exhibits a bluish-white metallic lustre; it is exceedingly malleable and ductile, and is very infusible, melting only before the oxyhydrogen blow-pipe, or in a very powerful blast-furnace such as that used by Deville and Debray. It expands less by heat than any other metal, and it is usually regarded as the heaviest form of matter yet known; but, according to Deville and Debray, osmium and iridium are about equally dense. It is unaffected by atmospheric action, and does not undergo oxidation in the air at even the highest temperatures. It is not acted on by nitric, hydrochloric, sulphuric, or hydrofluoric acid, or in short, by any single acid; but in aqua regia it slowly dissolves, and forms a soluble bichloride. In consequence of its power of resisting the action of acids, it is of great service in experimental and manufacturing chemical processes, P. spatulas, capsules, crucibles, etc., being employed in every laboratory; while P. stills, weighing sometimes as much as one thousand ounces, are frequently used for concentrating oil of vitriol. P. is emphatically the metal of the chemist: without it, chemistry could not have reached its present level. P. is, however, corroded if heated with the alkalies or alkaline earths, and especially with a mixture of nitrate of potash and hydrated potash, an oxide being formed which combines with the alkaline bases.

The form of the metal known as *spongy platinum* has been above noticed. The metal may however be obtained in a state of subdivision much finer than that in which it is left on heating the double chloride of P. and ammonium—namely, in the state known as *Platinum Black*. In this form it resembles soot. It may be prepared in various ways, of which one of the simplest is to boil a solution of tetrachloride of P., to which an excess of carbonate of sodium and a quantity of sugar have been added, until the precipitate formed after a little time becomes perfectly black, and the supernatant liquid colorless. The black powder is then collected on a filter, washed, and dried by a gentle heat. In its finely comminuted state, either as spongy P. or P. black, P. possesses remarkable power of condensing and absorbing gases, one volume of P. black being able to absorb more than 100 volumes of oxygen. This absorption appears to be accompanied by a conversion of some or all of the oxygen into the modification known as Ozone (q.v.), since the metal becomes capable of exerting the most energetic oxidizing action, even at ordinary temperatures. For example, it can cause the combustion of a jet of hydrogen, can oxidize sulphurous acid into sulphuric acid, ammonia into nitric acid, and alcohol into acetic acid, the rise of temperature in the last case being often sufficiently great to cause inflammation. P. in the compact form, as foil or wire, possesses similar powers, but in far lower degree.

P. may be easily alloyed with most of the metals, the alloys being in general much more fusible than pure P. Hence care must be taken not to heat the oxides of metals of easy reduction, such as lead and bismuth, in P. crucibles, as, if any reduction took place, the crucible would be destroyed by fusion of the resulting alloy. An alloy of P., iridium, and rhodium is found, by the investigations of Deville and Debray, to be harder, and capable of resisting a higher temperature than the pure metal; and hence is admirably adapted for formation of crucibles, etc.

There are two *oxides* of P., a monoxide, PtO, and a dinoxide PtO_2, neither of which can be formed by direct union of the elements. Except that the change which P. vessels undergo when containing the caustic alkalies, etc., and exposed to a red heat, is due to the formation of a superficial layer of oxide (probably dinoxide), these compounds are of little interest. The *sulphides* and *chlorides* correspond in number and composition to the oxides. Of these compounds, the tetrachloride ($PtCl_4$) alone requires notice. It is formed by dissolving P. in aqua regia, and evaporating the solution to dryness; and it is obtained as a deliquescent, reddish-brown mass, which forms an orange-colored solution in water, from which, on evaporation, it crystallizes in prisms. It is also freely soluble in alcohol and ether. A solution of this salt is used for recognition and determination of potash and ammonia.

By the action of ammonia on protochloride of P. (which is obtained by heating a solution of the bichloride to a temperature of 450° F.), several remarkable compounds are formed, which possess strong basic characters, and are of great interest in a theoretical view, such as Platosamine. PtH_3NO, Platinamine, PtH_3NO_2, etc

PLATITUDE, n. *plăt'ĭ-tūd* [F. *platitude*, flatness—from *plat*, flat]: dulness; insipidity; that which exhibits flatness or dulness. PLAT'ITUDES, n. plu. *-tūdz*, weak, empty, trite, or stupid remarks.

PLATO, *plā'tō:* philosopher, who, with Aristotle, represents to modern Europe the whole compass of Greek speculation: B.C. 427—B.C. 347; b. Athens, shortly after the commencement of the Peloponnesian war; son of Ariston. His birth was in the same year in which Pericles died; and his literary activity may be assigned to the first half of B.C. 4th c. He was of good family, being connected, on the mother's side, with Solon; and on the father's side, with Codrus, one of the ancient kings of Athens. He received a good education, according to the common practice of the Greeks, in music, gymnastics, and literature. His rich and gorgeous imagination is said to have essayed its powers at first in poetry; but when about 20 years of age, having become acquainted with Socrates, he threw all his verses into the fire, and devoted his great intellect to philosophy. When he was 20 years old, the political troubles, of which the death of Socrates was only one terrible symptom, forced him to leave Athens for a season, and he resided at Megara, with Euclid, founder of the Megaric sect. The disturbed state of his native country, doubtless, also was one cause of the frequent travels which he is reported to have made. Of these, his three visits to Sicily, during the time of the elder and younger Dionysius, are most famous and best authenticated. That he visited Italy is extremely probable; at all events, he was most closely connected with Archytas and the Pythagorean philosophers; though, as Aristotle (*Metaph.* i. 6) justly remarks, he borrowed from Heracleitus as well as from Pythagoras, and put a stamp of freshness and originality on all that he borrowed. After returning from his first visit to Sicily, being then in his 40th year, he began teaching philosophy publicly, in the Academeia, a pleasant garden in the most beautiful suburb of Athens, and there gathered around him a large school of distinguished followers, who maintained a regular succession after his death, under the name Philosophers of the Academy. He lived to the age of 80; was never married; and must have possessed some independent property, as he expresses himself strongly against teaching philosophy for fees, and we nowhere read of his having held any public office from which he could have derived emolument. These are the few facts known as to the life of Plato.

The principles of his philosophy are happily better known; for all his great works have been preserved, and have always been extensively read wherever the Greek language has been known. The only danger to which the students of his philosophy have been exposed is the confusion of the doctrines distinctly taught by him with the exaggeration of these as afterward worked out by the Neo-Platonists of Alexandria; but this is a danger which the exact critical scholarship of modern times has put out of the way for all persons who exercise ordinary precaution in acquisition of knowledge. The distinctive character of the Platonic philosophy is expressed by the word idealism as opposed to realism, materialism, or sensationalism—using these words in their most general and least technical sense

—the capacity of forming and using ideas being taken as an essential virtue or quality of mind, as contrasted with matter; of thought as contrasted with sensation; of the internal forces of individuals and of the universe, as contrasted with the external forms by which these forces are manifested. As such, the ideal philosophy, Platonism, stands generally opposed to that kind of mental action which draws its stores principally from without, and is not strongly determined to mold the materials thus received by any type of thought or hue of emotion derived from within. In other words, the philosophy of P. is essentially a poetical and an artistical philosophy; for poetry, painting, and music all grow out of idealism, in the sphere of those lofty inborn conceptions by which genius is distinguished from talent. It is, at the same time, a scientific philosophy, for the purest science, e.g., mathematics—on which P. is well known to have placed the highest value—is a science of mere ideas or forms conditioned by the intellect which deduces their laws; and, above all, it is essentially a moral and a theological philosophy, for practice, or action, is the highest aim of man, and morality is the ideal of action; and God, as cause of all, is the ideal of ideals, the living essence of supreme power, virtue, and excellence to which all contemplation recurs, and from which all action and original energy proceed. The distinctive excellence of the Platonic philosophy is identical with its distinctive character, and consists in that grand union of abstract thought, imaginative decoration, emotional purity, and noble activity, which is the model of a complete and richly endowed humanity. The poetical element in P., so wonderfully combined with the analytical, shows itself not only in those gorgeous myths which form the peroration of some of his profoundest dialogues, but in that very dialogic form itself, of which the situation is often extremely dramatic; though this form of philosophic discussion perhaps owes its existence more to the lively temper and out-of-door habits of the Greeks than to the special dramatic talent of Plato. On the other hand, the defects of the Platonic philosophy arise from its essential one-sidedness, as a polemical assertion of the rights of thought against the claims of the senses, of the stability of the eternal type against the constant change that characterizes the ephemeral form. In his zeal to submit all that is external to the imperatorial power of internal conception, the philosopher of ideas is apt to forget the obstinate and unpliable nature of that external world which he would regulate; and after projecting a grand new scheme of society, according to what appears a perfect model, he appears like the architect who, after drawing out the model of a marble temple, finds that he has only bricks with which to build it. For this reason, extremely practical men, and those who are compelled to reason chiefly by an extensive induction from external facts, have ever felt an instinctive aversion to the Platonic philosophy; and P. himself, by some of the strange and startling conclusions, in matters of social science, to which his ideal philosophy led, has, it must be confessed, put into the

PLATO.

429-348 B.C.

SYNTHETIC PHILOSOPHY.

From bust in the Ufizzi, Florence.
Engraved by Ambroise Tardieu.

hands of his adversaries the most efficient weapons by which his ideal system may be combated.

The starting-point of the Platonic philosophy, is the theory of knowledge. This is set forth in the *Theætetus*, the *Sophistes*, and the *Parmenides;* and in the *Cratylus*, the foundations are laid for a science of language, as the necessary product of a creature energizing by ideas. The Platonic theory of knowledge, as developed in the *Theætetus*, will be most readily understood by imagining the very reverse of that which is vulgarly attributed to Locke—viz., by drawing a strong and well-marked line between the province of thought and that of sensation in the production of ideas, and by taking care that, in the process of forming conceptions, the mind shall always stand out as the dominant factor. In other words, the hackneyed simile of the sheet of blank paper, applied to the mind by extreme sensational philosophers, must either be thrown away altogether or inverted; the more active part of the operation must always be assigned to the mind. The formation of knowledge, according to P., may be considered the gradual and systematic elimination of the accidental and fleeting in the phenomenon from the necessary and permanent; and the process by which the mind performs this elimination—and it can be performed only by mind—is called *Dialectics*. This word, from *dialégomai*, originally signifies only conversational discussion; thence, that discussion conducted in such scientific fashion as to lead to trustworthy results, i.e., strictly logical. The product of dialectics is ideas, and these ideas being the *éidê*, forms or types of things which are common to all the individuals of a species, all the species of a genus, all the genera of a family, and all the families of a class, generate classification—i.e., knowledge of the permanent in phenomena—and definition, which is merely the articulate verbal expression of this permanency. The construction of the confused results of observation into the orderly array of clear conceptions, by a sort of cross-examination of the phenomena, performed by minds impassioned for truth, is exhibited as the great characteristic of the teaching of Socrates, in the *Memorabilia* of Xenophon. In the dialogues of P., the same purification of the reason, from the clouds of indistinct sensuousness, is exhibited on a higher platform and with more comprehensive results. For between Socrates and P., notwithstanding a deep internal identity, there was this striking difference in outward attitude—that Socrates used logic as a practical instrument in the hands of a great social missionary and preacher of virtue; while Plato used it as the architect of a great intellectual system of the universe, first for his own time and his own place, but, as the event has proved, in some fashion also for all times and all places.

We should err greatly, however, if we looked on P. as a man of mere speculation, and a writer of metaphysical books, like certain German professors. Neither P. nor any of the great Greeks looked on their intellectual exercises and recreations as an end in themselves. With them, philosophy did not mean mere knowledge or mere speculation, but it meant wisdom, and wisdom meant wise action, and wise action meant virtue. The philosophy of P., therefore, with all its transcendental flights, of which we hear so much, was essentially a practical philosophy; all his discussions on the theory of knowledge and the nature of ideas are undertaken mainly that a system of eternal divine types, as the only trustworthy knowledge, may serve as a foundation for a virtuous life, as the only consistent course of action. Virtue, with Socrates and P., is only practical reason. As in the Proverbs of Solomon, all vice is folly, so in the philosophy of P., the imperial virtue is *phronēsis*—i.e., 'wisdom' or practical 'insight.' The other two great Greek and Platonic virtues—*sōphrosynē*, 'moderation' or 'soundmindedness,' and *dikaiosynē*, 'justice,' or the assigning to every act and every function its proper place—are equally exemplifications of a reasonable order applied to action—such an order as alone and everywhere testifies the presence of mind. The theory of morals as worked out from such principles is, of course, as certain as the necessary laws of the reason which it expresses; and accordingly, the Platonic morality, like the Christian, is of that high order which admits no compromise with ephemeral prejudice or local usage. The contrast between the low moral standard of local respectability and that which is congruous with the universal laws of pure reason, stands out as strikingly in Plato, as the morality of the Sermon on the Mount in the Gospels does against the morality of the Scribes and Pharisees. Splendid passages to this effect occur in various parts of P.'s writings, particularly in the *Republic* and the *Gorgias*. In perfect harmony with the Platonic theory of noble action, is his doctrine with regard to pure emotion and elevated passion. Love with P. is a transcendental admiration of excellence—an admiration of which the soul is capable by its own high origination and the germs of godlike excellence, which are implanted into it from above. The philosophy of love is set forth with imaginative grandeur in the *Phædrus*, and with rich dramatic variety in the *Banquet*, of which dialogue there is an English translation by Shelley. The philosophy of beauty and the theory of pleasure are set forth with great analytic acuteness in the *Philebus*. With P., the foundation of beauty is a reasonable order, addressed to the imagination through the senses—i.e., symmetry in form, and harmony in sounds, the principles of which are as certain as the laws of logic, mathematics, and morals—all equally necessary products of eternal intellect, acting by the creation and by the comprehension of well-ordered forms, and well-harmonized forces, in rich and various play through the living frame of the universe; and the ultimate ground of this lofty and coherent doctrine of intellectual, moral, and æsthetical harmonies lies in P.'s system, where alone it can lie, in the unity of a supreme, reasonable, self-existent intelligence, whom we know as the living God, the fountain of all force, and the creator of all order in the universe; the sum of whose most exalted attributes, and the substantial essence of whose perfection may, as contrasted with our finite and partial aspects of things, be expressed by the simple term *tò agathòn*—the GOOD. From this supreme and all-excelling intelligence, human souls are offshoots, emanations, or sparks, in such a fashion, that they partake essentially of the essential character of the source from which they proceed, and accordingly possess unity as their most characteristic quality, attest their presence everywhere by a unifying force which acts by impressing a type on whatever materials are submitted to it, and is filled with a native joy in the perception of such types, the product of the same divine principle of unity, wheresoever presented. The undivided unity and unifying force which we call the soul is immortal, being from its nature altogether unaffected by the changes of decay and dissolution to which the complex structure of the material human body is exposed. The doctrine of the immortality of the soul is most fully set forth in the *Phædo*, a dialogue which combines with the abstract philosophical discussion a graphic narrative of the last hours of Socrates, which, for simple pathos and unaffected dignity, is unsurpassed by any human composition.

The most complete and systematic exhibition of the opinions of P. is in the *Republic*, or ideal commonwealth, of which an excellent English translation has been recently made by Davies and Vaughan. The *Republic* is not, as the title would lead us to suppose, a political work, like the *Politics* of Aristotle. It is, as Baron Bunsen well remarked, not so much a state as a church with which this great work has to do; or at least, both a state and a church; and the church is the superior and dominating element. In the *Republic*, accordingly, we find the necessity of virtue to the very idea of social life proved in the first book; then the whole process of a complete moral and scientific education is set forth with such fulness as to throw the strictly political part of the book, including the germs of what is now called political economy, very much into the shade. The principles and government of an ideal moral organism, of which the rulers shall be types of fully developed and perfectly educated men, is the real subject of the *Republic*, which accordingly forms a remarkable contrast to the inductive results of the thoroughly practical work of Aristotle on the same subject. P.'s commonwealth is a theoretical construction of a perfect ideal state of society; Aristotle's is a practical discussion on the best form of political government possible under existing conditions. Of the value of P.'s work, both suggestively in the world of politics, and dogmatically in the region of moral and religious speculation, there can be no doubt; but as a practical treatise on politics, it is vitiated throughout, both by its original scheme and by an inherent vice in the author's mind, which prevented him from recognizing the force of the actual in that degree which necessarily belongs to such a complex art as human government. Of this fault, the author was himself sufficiently conscious, and has accordingly, in another large political treatise, the *Laws*, endeavored, for practical purposes, to make some sort of compromise between the transcendental scheme of his *Commonwealth* and the conditions of existing society. But however he might modify individual opinions, there was a one-sidedness about P.'s mind, which rendered it impossible for him to struggle successfully with the difficulties of complex practical politics. He was too much possessed with the idea of order, and, moreover, had planted himself with too manifest a polemical attitude against Athenian democracy, to give due weight to the opposite principle of freedom, proved by experience to be so indispensable to every vigorous political development.

Physical science, in the days of P., stood on no basis sufficiently sure or broad to authorize a philosophy of the material universe with any prospect of success. Nevertheless, in his *Timæus*, the great philosopher of ideas has attempted this; and it is a work which, however valueless in the face of the grand results of modern chemical and kinetical research, will ever be consulted with advantage as a grand constructive summary of the most important facts and theories of nature known to the Greeks, previously to the accurate observations of Aristotle, and the extended mathematics of the Alexandrian school. The great question as to what matter is, and whence, P. nowhere seems to settle clearly; but the general tendency of ancient thought was toward a dualism, which recognized the independent existence of a not very tractable element called matter, in which P. seems to have acquiesced.

The works of P. were extensively studied by the church Fathers, one of whom joyfully recognizes, in the great teacher of the Academy, the schoolmaster who, in the fulness of time, was destined to educate the heathen for Christ, as Moses did the Jews. A lofty passion for P. likewise seized the literary circle of the Medici at the period of the revival of letters in Italy. Since that time, the tyrannous sway of Aristotle, characteristic of the middle ages, has always been kept in check by a strong band of enthusiastic Platonists in various parts of Europe. Since the French Revolution particularly, the study of Plato has been pursued with renewed vigor in Germany, France, England, and the United States; and many distinguished English authors, without expressly professing Platonism—e.g., Coleridge, Wordsworth, Mrs. Browning, Ruskin, etc.—have formed a strong and growing party of adherents, who could find no common banner under which they could at once so conveniently and so honorably muster as that of Plato. The amount of learned labor expended on the text of P., during the 19th c., has been in proportion; and in this department the names of Bekker, Ast, and Stallbaum stand pre-eminent. Prof. Jowett also, in Oxford, has made P. his standard author for many years; from his hand came 1871 a translation of the *Dialogues of Plato*. Mr. Grote, the historian of Greece, published his *Plato and the Other Companions of Socrates*, 1864. One of the best accounts of the Platonic philosophy is given in Zeller's *Phil. der Griechen*, of which the part on *P. and the Older Academy* was translated 1876. Platonism has found in the United States also profound students and interesting advocates.

PLATOFF, *plâ′tof*, Matvei Ivanovitch, Count: Hetman of the Cossacks of the Don, and a Russian cavalry general: 1757, Aug. 6—1818; b. on the banks of the Don, of an ancient and noble family which had emigrated from Greece. Having acquired reputation for wisdom and bravery, he was appointed by Czar Alexander I. Hetman of the Cossacks; and subsequently as a lieut gen. in the Russian army, and afterward as commander of the Russian irregular cavalry, he was prominent in the wars with France and Turkey. After the French had evacuated Moscow, and retreated, P. hung upon their rear with utmost pertinacity, wearying them out by incessant attacks, cutting off straggling parties, capturing their convoys of provisions, and keeping them in continual apprehension. The French historians state that Bonaparte's army suffered more loss from the attacks of P.'s Cossacks than from privation and exhaustion. He defeated Lefebvre at Altenburg. After the rout of the French at Leipzig, he inflicted great loss on them in their retreat, and subsequently gained a victory over them at Laon. The inhabitents of Seine-et-Marne will long remember the devastations and pillage of his undisciplined bands. He was enthusiastically welcomed by the Parisians (to their shame), also by the English, who presented him with a sword of honor on his visit to London in company with Marshal Blücher. The allied monarchs loaded him with honors and decorations, and the czar gave him the title count. He retired to his own country, and died near Tcherkask. No other Russian gen. ever exercised such influence over his soldiers.

PLATONIC, a. *plă-tŏn′ĭk*, or Platon′ical, a. *-ĭ-kăl* [after *Plato*, a famous anc. Greek philosopher]: pertaining to Plato or to his philosophy: pure; spiritual. Platon′ically, ad *-lĭ*. Platonize, v. *plā′tŏn-īz* or *plăt′ŏn-īz*, to think with, or reason as, Plato. Pla′tonizing, imp. Pla′tonized, pp. *-īzd*. Pla′tonist, n. *-ĭst*, one who adheres to the philosophy of Plato. Pla′tonism, n. *-ĭzm*, doctrines of Plato, the great fountain of ancient ethics, who taught the eternity of God and matter, the love of truth, wisdom, and beauty, that the supreme and eternal mind contains them all, and that virtue is the harmony of the whole soul (see Plato: also Neo-Platonism). Platonic bodies, the five regular geometrical solids, described first by Plato—viz., the tetrahedron, hexahedron, octahedron, dodecahedron, and icosahedron. Platonic love, pure spiritual love subsisting between two persons of different sex, which is presumed to be unaccompanied by any sensuous emotions, and to be based on moral or intellectual affinities; Plato having taught that the common sexual love of the race, harassed and afflicted with fleshly longings, is only a subordinate form of that perfect and ideal love of truth which the soul should cultivate. Platonic year, the complete revolution of the equinoxes in about 26,000 years.

PLA′TONISTS, New: see Neo-Platonism.

PLATOON, n. *plă-tôn'* [F. *peloton*, a clew or little ball of thread—from *pelote*, a ball: Sp. *peloton*, a crowd of persons, a body of soldiers—from L. *pĭla*, a ball]: *formerly*, a small body of soldiers who fired together, drawn from a battalion to strengthen the angles of a square; *now*, two files forming a sub-division of a company. What was called 'platoon exercise,' now 'firing exercise,' is the course of motions in connection with handling, loading, and firing the musket or rifle.

PLATT, JOHNSON TOUSEY: jurist: 1845, Jan. 12—1890, Jan. 23; b. Newtown, Conn. He graduated from the Harvard Law School 1865, and practiced law in Pittsfield, Mass., New York, and New Haven. On the reorganization of the Yale Law School 1869, he became prof. in that school; later was corporation counsel of New Haven, and did much valuable legal work for the city. He was U. S. commissioner 12 years to 1884; he was also master of chancery of the dist. of Conn. His character and work were much esteemed.

PLATT, JONAS: 1769, June 30—1834, Feb. 22; b. Poughkeepsie, N. Y.; son of Zephaniah P. He studied law with Richard Varick; settled as a lawyer in Whitesboro, near Utica; was gen. of cavalry in state militia; member of congress 1799–1800; four years in state senate from 1809; made the first motion in the senate for construction of the Erie canal, seconded by De Witt Clinton, 1810. He was made judge of the supreme court 1814, and member of the convention that framed the state constitution 1821. He died on his farm near Plattsburg, N. Y.

PLATT, ORVILLE HITCHCOCK: born Washington, Conn., 1827, July 19. He received an academic education, studied law, and began practice 1849. He was clerk of the Conn. state senate 1855–6; sec. of state of Conn. 1857; was in the state senate 1861–2, and in the state house of representatives 1864 and 69. Elected to the U. S. senate as a republican, he took his seat 1879, Mar. 18; he was re-elected 1885, 1891 and 1897.

PLATT, THOMAS COLLIER: politician: b. Owego, N.Y., 1833, July 15. His health failed while he was at Yale College, and he left in his Sophomore year and engaged in business. He became pres. of a bank in Tioga, N. Y.; was interested in the lumber business in Mich.; member of the lower house of congress as a republican 1873–77, and of the senate for a few weeks 1881, resigning with Mr. Conkling because of disagreement as to control of federal official appointments in New York; and was defeated for re-election. He was a quarantine commissioner of the port of New York 1880–88, was removed in the latter year, and his appeal to the courts for reinstatement was denied. In 1890, Sept., he was appointed one of the commissioners to select a site for a dry-dock on the Pacific coast n. of Cal. For some years he was pres. of a railroad, and since 1880 has been pres. of the United States Express Company. Later, he became a well-known republican leader, and was a member of the U. S. Senate 1897.

PLATT, ZEPHANIAH: 1735, May 27—1807, Sep. 12; b. Huntington (L. I.), N. Y. He purchased a farm at Poughkeepsie about 1770, soon became prominent in Dutchess co., was a member of the continental congress, and a sterling patriot. He was chosen to the N. Y. convention of 1776 for framing a constitution for the state; 1777 he was one of the committee of safety for Dutchess co.; 1778 he was elected a state senator. His vote helped to make the small majority by which N. Y. ratified the constitution of the United States. He was made first judge of Dutchess co., serving till 1795. The founding of Plattsburg was his closing work; and there he died.

PLATTDEUTSCH, *plât-doytsh* (*Niederdeutsch*), or LOW GERMAN: language of the lowlands of n. Germany, spoken n. of a line passing through Aachen, Bonn, Cassel, Dessau, Wittenberg, and the n. limits of Polish and Lithuanian. It belongs to the same group as the Dutch of the Netherlands (q.v.), Flemish (q.v.), and Frisian (q.v.); and is at the same level of consonantal change as English and Gothic (see GRIMM'S LAW: GERMANY). Its most ancient monument is the *Hèliand* (see SAXONS); till the Reformation, it was the literary language within the limits above named (see REYNARD THE FOX: OWLGLASS), the oldest German translation of the Bible being Low German (see BIBLE). Since then it has been little cultivated, till the times of Klaus, Groth, and Fritz Reuter (q.v.), the chief modern writers in this tongue. It has various local dialects, as Mecklenburgish, East-Frisian, etc.

PLATTE, *plăt* (or NEBRASKA), RIVER: largest river in the state of Neb.; formed by the union, in Lincoln co., of the North P., which rises in the North Park of Colo., and the South P., which has its source in the South Park of that state. It passes about 900 m. e. through the central part of the state to Plattsmouth, at which point it empties into the Missouri. It is a very wide but shallow stream, and of little use for navigation. Its chief tributaries are the Loup Fork and the Elkhorn. It drains about 7.500 sq. m., and the valley through which it passes is noted for fertility.

PLAT'TEN-SEE: see BALATON.

PLATTER, PLATTING: see under PLAT 1. PLATTER, n. a dish: see under PLATE.

PLATTSBURG, *plăts'bĕrg:* city, cap. of Clinton co., N. Y.; on the Delaware and Hudson Canal Company's and the Chateaugay railroads, at the mouth of the Saranac river, on the w. shore of Lake Champlain; 20 m. n.w. from Burlington, Vt., 63 m. s. from Montreal. There are two Presb. churches, two Rom. Cath., one each Meth. Episc., Prot. Episc., and Bapt., and a Jewish synagogue; schools of high grade; one daily and three weekly papers in English, and a semi-weekly and a weekly in French; four national banks (cap. $400,000); and several hotels. There are foundries, sewing-machine shops, wagon factories, lumber-mills, and woolen-mills; water-works, gas-works, and an electric light plant. The city is a point of shipment for iron, mined near by, and for lumber and grain. In summer steamers are run to Burlington and other points. The remarkable Ausable Chasm is only 12 m. distant. A victory over the British was gained here by Gen. Macomb 1814, Sep. 11 and a great naval victory was won the same day, on the bay, in front of P., by Commodore Macdonough: see Champlain, Lake. P. was incorporated as a town 1785. Pop. (1870) 5,139; (1880) 5,245; (1890) 7,010; (1900) 8,434.

PLATTSMOUTH, *plăts′mŭth:* manufacturing city and railroad centre, county seat of Cass co., Neb.; on the Missouri river, 1½ m. below its junction with the Platte; 22 m. s. of Omaha, 55 m. e.n.e. of Lincoln. It is on the Burlington and Missouri River and the Chicago Burlington and Quincy railroads, the latter crossing the Missouri river at this point. It has a fine high-school building, a foundry, and machine-shops; and manufactures flour, wagons, engines, and reed-organs. Pop. (1870) 1,944; (1880) 4,175; (1885) 5,796; (1890) 8,392; (1900) 4,964.

PLATY-, *plăt′ĭ-* [Gr. *plătus,* flat]: a prefix signifying 'flat or broad.'

PLATYCEPHALIC, a. *plăt′ĭ-sē-făl′ĭk,* or Plat′yceph′alous, a. *-sĕf′ă-lŭs* [Gr. *plătus,* broad; *kephălē,* the head]: broad-headed, as the flat-skulled tribes of the human family.

PLATYCRINITE, n. *plă-tĭk′rĭn-īt,* or Platyc′rinus, n. *-rĭn-ŭs* [Gr. *plătus,* broad; *krinon,* a lily]: in *geol.,* a genus of encrinites peculiar to the carboniferous limestones—so termed from the flatness and breadth of the basal and radial plates of the receptacle.

PLATYELMIA, n. plu. *plăt′ĭ-ĕl′mĭ-ă* [Gr. *plătus,* broad; *helmins,* an intestinal worm—from *helissō,* I roll or wind round]: the division of the Scolecida comprising the tapeworms.

PLATYLOBEÆ, n. plu. *plăt′ĭ-lō′bē-ē* [Gr. *plătus,* broad; *lobos,* a lobe]: in *bot.,* a general name for the tribes *Pleu′rorhi′zĕæ* and *Notorhi′zĕæ,* meaning that the cotyledons are plane or flat. Platyphyllous, a. *plăt-ĭf′ĭl-ŭs* [Gr. *phullon,* a leaf]: in *bot.,* broad-leaved.

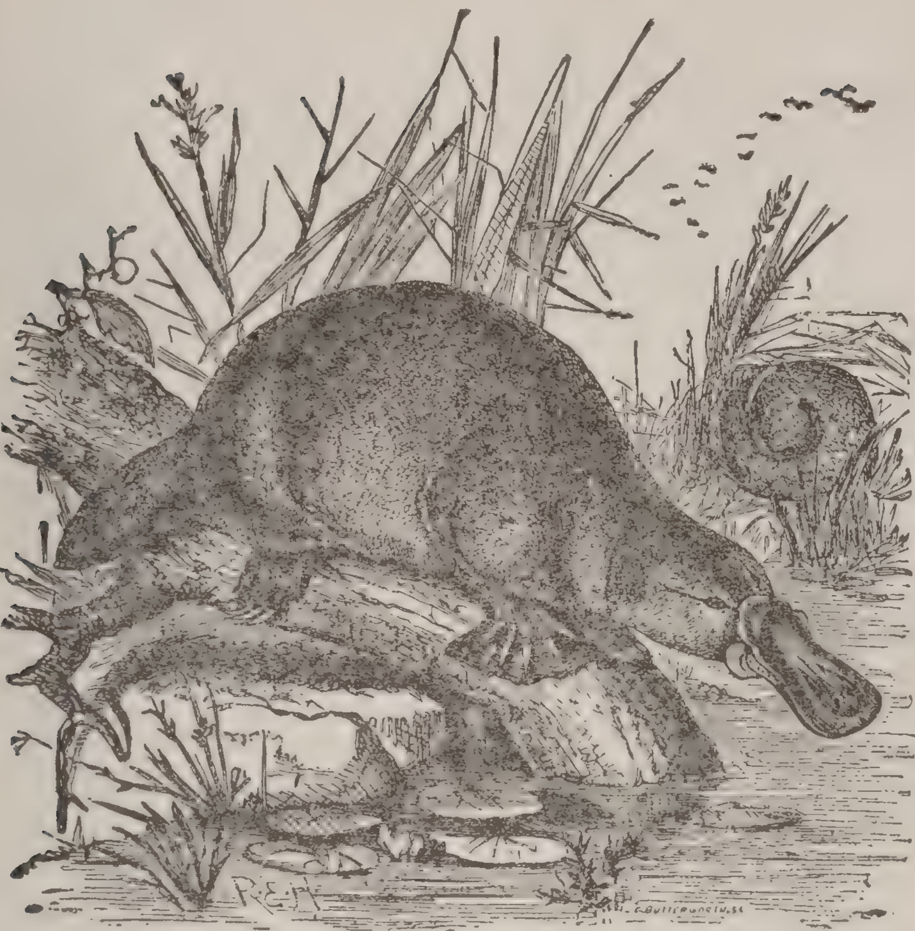
PLATYPUS, n. *plăt′ĭ-pŭs* [Gr. *plătus,* broad or flat; *pous,* a foot]: Australian quadruped having flat, webbed feet, and a bill like a duck; called also *ornithorhynchus:* see Duck-bill.

PLATYRHINA, n. plu. *plăt′ĭ-rī′nă* [Gr. *plătus,* broad; *rhinĕs,* nostrils]: a group of the Quadrumana. Platyrhine, a. *plăt′ĭ-rĭn,* broad-nosed; applied to the new-world monkeys, which have their nostrils separated from each other by a broad septum.

PLATYSMA, n. *plă-tĭs′mă* [Gr. *platusmos,* widening, enlargement—from *plătus,* wide]: in *anat.,* a broad, thin, muscular expansion lying under the skin at each side of the neck.

PLATYSOMES, n. plu. *plăt′ĭ-sōmz* [Gr. *plătus,* broad; *sōma,* the body]: a family of coleopterous insects, comprehending species with a wide and much-depressed body.

PLATE 2.



Platypus. From Gould's *Mammals of Australia.*

Plantain.

Pluto.

PLATYSOMUS, a. *plă-tĭs'ō-mŭs* [Gr. *plătus*, broad; *sōma*, the body]: broad-bodied—applied to a fossil ganoid fish, from its deep bream-like body.

PLATYSTOMA, *pla-tĭs'to-ma* [Gr. broad-mouth]: genus of fishes of family *Siluridæ,* having a very flat (depressed) snout, and a very large mouth with six long barbels; the skin quite destitute of scales; two dorsal fins; the eyes lateral, level with the nostrils. The species are numerous, some attaining large size, many notable for distinct and conspicuous markings. Several are natives of rivers of n.e. S. America; among these are some of the most beautiful and delicious fresh-water fishes, e.g., *P. tigrinum,* known among different tribes of Indians by various names—*Corutto, Colite, Oronni,* etc.—which has an elongated body, light blue, transversely streaked with black and white, and a spreading forked tail. It is both taken by baited hooks and shot with arrows by Indians, as are several other species, some of which are found as far s. as Buenos Ayres.

PLAUDIT, n. *plaw'dĭt* [L. *plaud'ite,* clap hands—the word which ended anc. L. dramas, and was addressed to the audience—from *plaudo,* I clap the hands in token of approbation]: praise bestowed; applause—usually in the plu. PLAU'DITS, *-dĭts.* PLAU'DITORY, a. *-dĭ-tėr-ĭ,* applauding; commending.—SYN. of 'plaudit': shouting; applause; acclamation; commendation; approbation; encomium; praise.

PLAUEN, *plow'ĕn:* important manufacturing town of Saxony, in a beautiful valley on the White Elster, 74 m. s. of Leipsic by railway. It was the chief town of the Saxon Voigtland, and its castle was formerly the residence of the Voigt, or imperial commissioner, but is now used as the seat of justice and other courts. P. contains a gymnasium, a royal palace, and numerous educational and benevolent institutions. It has extensive manufactures of muslin, cambric, and jaconet goods, and embroidered fabrics and cotton goods. 1844, Sep., 150 buildings were destroyed by fire, and afterward the town was almost wholly rebuilt. Pop. (1885) 42,755; (1890) 47,008; (1900) 73,888.

PLAUSIBLE, a. *plawz'ĭ-bl* [F. *plausible*—from L. *plausib'ĭlĭs,* deserving of applause—from *plaudere,* to clap the hands in token of approbation: It. *plausibile*]: apparently right; specious; superficially pleasing or taking; popular. PLAUS'IBLY, ad. *-ĭ-blĭ,* with fair show. PLAUS'IBLENESS, n. *-bl-nĕs,* or PLAUS'IBIL'ITY, n. *-bĭl'ĭ-tĭ,* the state of being plausible; speciousness. PLAUSIVE, a. *plawz'ĭv,* in *OE.,* applauding; plausible.—SYN. of 'plausible': ostensible; colorable; specious; superficial.

PLAUTUS, *plaw'tŭs,* M. ACCIUS (correctly, T. MACCIUS): the great comic poet of Rome: about B.C. 254–184; b. Sarsina, village in Umbria. We have no knowledge of his early life and education; but it is probable that in youth he came to Rome and there acquired mastery of the Latin language in its most idiomatic form, as well as familiarity with Greek literature. It is uncertain whether he ever obtained the Roman franchise. His first ployment was with the actors, in whose service he saved money enough to enable him to leave Rome and commence business on his own account. Wherever or whatever this business was, he failed in it, and returned to Rome, where he earned his livelihood in the service of a baker. At this time—a few years before the outbreak of the second Punic war—he was probably about thirty years of age; and while employed in his humble occupation, he composed three plays, which he sold to the managers of the public games, and whose proceeds enabled him to turn to more congenial work. The commencement of his literary career may, therefore, be fixed about B.C. 224, from which date he continued to produce comedies with wonderful fertility, till he died, in his 70th year. He was contemporary at first with Livius Andronicus and Nævius; subsequently with Ennius and Cæcilius.

Of his numerous plays—130 of which bore his name in the last century of the republic—only 20 have come down to us. Many of them, however, were regarded as spurious by the Roman critics, among whom Varro, in his treatise (*Quæstiones Plautinæ*), limits the genuine comedies of the poet to 21. With the exception of the 21st, these Varronian comedies are the same as those which we now possess. Their titles, arranged (except the Bacchides) in alphabetical order, are as follows: 1, *Amphitryo;* 2, *Asinaria;* 3, *Aulularia;* 4, *Captivi;* 5, *Curculio;* 6, *Casina;* 7, *Cistellaria;* 8, *Epidicus;* 9, *Bacchides;* 10, *Mostellaria;* 11, *Menæchmi;* 12, *Miles;* 13, *Mercator;* 14, *Pseudolus;* 15, *Pœnulus;* 16, *Persa;* 17, *Rudens;* 18, *Stichus;* 19, *Trinummus;* 20, *Truculentus;* 21, *Vidularia.* As a comic writer, P. had immense popularity among the Romans, and held possession of the stage till the time of Diocletian. The vivacity, the humor, and the rapid action of his plays, as well as his skill in constructing plots, commanded the admiration of the educated no less than of the unlettered; while the fact that he was a national poet prepossessed his audiences in his favor. Although he laid the Greek comic drama under heavy contributions, and 'adapted' the plots of Menander, Diphilus, and Philemon with all the license of a modern playwright, he always preserved the style and character native to the Romans, and reproduced the life and intellectual tone of the people in a way that at once conciliated their sympathies. The admiration in which he was held by his contemporaries descended to Cicero and St. Jerome; while he has found imitators in Shakespeare, Molière, Dryden, Addison, and Lessing, and translators in most European countries. The only complete translation of his works into English is by Thornton and Warner (5 vols. 1767–74). Unfortunately the text of his plays, as they have come down to us, is so very corrupt, so defective from lacunæ, and so filled with interpolations, that much remains to be done by the grammarian and the commentator before they can be read with full appreciation or comfort. The *editio princeps* was printed at Venice 1742. Weise and Fleckeisen have given us good modern editions; but that of Ritschl (1st ed. 1848–54; 2d ed. 1871) shows such admirable acuteness and learning as to have superseded all others.

PLAY, n. *plā* [AS. *plega*, a game, sport, or skirmish; *plegan*, or *plegian*, to play—the idea in play is the exercise of the natural activity of the creature for the mere pleasure of the exertion: prov. F. *plag*, or *play*, litigation, dispute: Sp. *pleito*, debate, strife: OF. *plaidier*, to litigate, to contest: Dut. *pladeren*, to contend: all connected with mid. L. *placitum*]: occupation or exercise of any kind to afford pleasure or diversion, as distinct from work; the exertion of powers of any kind, as the *play* of the lungs or muscles; sport; recreation; contest, as in a game; gambling; jest; swing; freedom of action to and fro; practice; action; scope; a dramatic composition, or the representation of it at a theatre; an exhibition or display, as of colors flitting or changing: V. to put into action, motion, or operation; to move irregularly; to perform on, as a musical instrument; to act; to exhibit or represent, as a piece in a theatre; to use some exercise for amusement or recreation; to toy or trifle; to give a fanciful turn to, as to a word; to make sport with or upon; to mock; to practice deception upon; to personate in a drama; to gamble. PLAY'ING, imp. PLAYED, pp. *plād*. PLAYER, n. *plā'ėr*, one who plays; an actor; a musician. PLAYFUL, a. *plā'fûl*, full of play; sportive. PLAY'FULLY, ad. *-lĭ*. PLAY'FULNESS, n. *-nĕs*, the state of being playful. PLAY'SOME, a. *-sŭm*, full of frolic and fun; wanton. PLAY-ACTOR, one who performs a part in a drama or play; a professional actor in a theatre. PLAY-BILL, a printed sheet narrating the performances at a theatre, and the parts, with the names of the actors who are to play them. PLAY-BOOK, a book of dramatic compositions. PLAY-DAY, a holiday. PLAYFELLOW, a companion in the sports of childhood or youth. PLAY-GOER, a frequenter of theatres. PLAY-GOING, that frequents theatres. PLAY HOUSE, a theatre. PLAYMATE, a companion in the sports of childhood or youth. PLAYTHING, a toy; anything that serves to amuse. PLAYWRIGHT, a writer of plays, in contempt; an adapter of plays. PLAYING-CARDS, cards with painted figures and devices for playing games: see CARDS. PLAY OF COLORS, appearance of a variety of colors on a body in rapid succession, as on turning a diamond. TO PLAY OFF, to display; to put into exercise; to pit one person against another to make them answer some desired end. TO PLAY ON or UPON, to deceive; to trifle with; to make sport of. TO HOLD IN PLAY, to keep occupied till some wished-for object is attained. PLAY THE DEUCE [see DEUCE 2]: to damage and injure anything. —SYN. of 'play, v.': to sport; frolic; toy; trifle; mock; operate; act; personate; represent; perform; amuse one's self; gamble. *Note.*—Skeat says the original sense of AS. *plega* is a stroke or blow, and accordingly derives it from L. *plaga*, a blow, stroke, thrust.

PLAYFAIR, *plā'fär*, JOHN: Scottish mathematician and natural philosopher: 1748, Mar. 10—1819, July 19; b. Benvie in Forfarshire. His father, minister of the united parishes of Liff and Benvie, sent him to the Univ. of St. Andrews at the age of 14, to study for the Presb. ministry; and here P. obtained such reputation as a scholar, especially in mathematics and natural philosophy, that while a student he for some time discharged the duties of the nat. philosophy chair during the illness of the professor. In 1773 he entered the ministry, and succeeded his father in the parish of Liff and Benvie. He still prosecuted his favorite studies; in 1782 he resigned his parochial charge, and 1785 became joint-prof. of mathematics with Adam Ferguson in the Univ. of Edinburgh; but exchanged his chair for that of nat. philosophy 1805. He became a strenuous supporter of the 'Huttonian theory' in geology; and after publishing his *Illustrations of the Huttonian Theory of the Earth* (Edin. 1802), he made many scientific journeys. He died at Edinburgh. P., according to Jeffrey (*Annual Biography* 1820), 'possessed in the highest degree all the characteristics both of a fine and a powerful understanding.' P. in his later years of life was sec. to the Royal Soc. of Edinburgh. From 1804 he was a frequent contributor to the *Edinburgh Review* of articles of scientific criticism. He wrote the articles 'Æpinus' and 'Physical Astronomy,' and an incomplete 'Dissertation on the Progress of Mathematical and Physical Science,' for the *Encyclopædia Britannica.* His contributions to the *Transactions of the Royal Soc. of Edinburgh* are numerous and exceedingly varied, a treatise on 'Naval Tactics' even appearing among them. His separate works are: *Elements of Geometry* (Edin. 1795); *Outlines of Nat. Philosophy* (Edin. 1812 and 16), being the heads of his lectures in the univ. on that subject.

PLAYFAIR, *plā'fär*, LYON, Baron, P., LH.D., F.R.S.: b. Bengal, 1819, May 21; son of George P. After studying at St. Andrews Scotland, he took special courses in chemistry, of which science he became prof. in the Royal Institution at Manchester 1843. He held various govt. positions, became prof. in the Univ. of Edinburgh 1858, and ten years later entered parliament; was postmaster-gen. 1873–4, pres. of the commission which reorganized the civil service 1874, and has held other important offices. He has given special attention to sanitary and social science, and has published several scientific books and papers. He was raised to the peerage 1892.

PLAZA, n. *plâ-zâ* [Sp. fr. L. *platea* (see PLACE)]: open place for traffic or pleasure, especially in a Spanish or S. American town.

PLEA, n. *plē* [F. *plaid;* It. *piato;* Sp. *pleito;* OF. *plait,* a suit at law—from mid. L. *placitum,* a plea—from L. *placēre,* to please]: in a *court of law,* the answer given by the defendant or defender to the declaration and demand of the plaintiff or pursuer; a suit at law; a criminal process (see below): an excuse or apology; something alleged in defense or justification. **PLEAD**, v. *plēd* [F *plaider,* to sue, to go to law]: to argue or reason in support of a claim; to offer in excuse; to vindicate; to supplicate; to argue before a court of justice; to admit or deny a charge of guilt, as in a trial. Plead'ing, imp.: Adj. imploring: N. act of a pleader, who supports by arguments; argument in a suit. Plead'ed, pp. offered or urged in defense; alleged in proof. Plead'er, n. *-ĕr*, one who pleads or argues in a court of justice; one who speaks for or against. Special pleader, one who devotes himself to the drawing up of common-law pleadings and the like, which enable the court and the jury to discover at one view the number and the nature of the precise points in dispute. Plead'ingly, ad. *-lĭ*. Plead'ings, n. *-ĭngz*, the mutual allegations in writing between a plaintiff and a defendant in a court of law before the trial. Plead'able, a. *-ă-bl*, that may be alleged in plea.

PLEACH, v. *plēch* [OF. *plesser* (see Plash 2)]: in *OE.*, to bend; to interweave, as twigs. Pleach'ing, imp. Pleached, pp. *plēcht:* Adj. entwined; fastened.

PLEAD: see under Plea.

PLEA—PLEADING, in Law: in a general sense, the conducting of suits; specifically, the response of a defendant to the allegations of a plaintiff. A plea is a statement of facts. It is *dilatory* when founded on facts not essential to the action, as when the court's want of jurisdiction is alleged, or the defendant's temporary inability to proceed, or when some matter is alleged as ground for abating or quashing the complaint. A plea is *peremptory*, or a 'plea in bar,' when it denies the whole, or the essential parts, of the complaint: a plea in bar may allege justification or excuse of the act complained of, satisfaction of an obligation, payment of a debt, etc. A plea *in confession and avoidance* admits the truth of the plaintiff's contention, but sets up other facts which annul its legal effect. Technically, *demurrer* is not a plea; but it is an 'answer to a complaint,' and therefore is in effect the same thing as a plea: see Demurrer.

PLEASE, v. *plēz* [F. *plaisir*, pleasure; *plaisant*, pleasing; *plaire*, to please—from L. *placēre*, to please]: to delight or gratify; to excite agreeable sensations in; to satisfy; to give pleasure; to gain satisfaction; to condescend; to comply; to like; to choose. Pleas'ing, imp.: Adj. giving pleasure; agreeable; gratifying; gaining approbation; acceptable. Pleased, pp. *plēzd.* Pleas'edness, n. *-ĕd-nĕs*, the state of being pleased. Pleas'er, n. *-ĕr*, one who pleases; one who tries to please; one who courts favor. Pleas'ingly, ad. *-lĭ*, in a manner to give delight. Pleas'ingness, n. *-nĕs*, the quality of giving pleasure. Pleasance, n. *plĕz'ăns* [F. *plaisance*]: in *OE.*, pleasantry; gayety; merriment. To be pleased with, to approve; to like. Pleasant, a. *plĕz'ănt*, grateful to the mind or senses; delightful; cheerful; agreeable; in *OE.*, trifling; ludicrous. Pleas'antly, ad. *-lĭ*, happily; gayly; merrily; in good-humor. Pleas'antness, n. *-nĕs*, the state or quality of being pleasant. Pleas'antry, n. *-rĭ*, gayety: merriment; humor; lively talk. **Pleasure**, n. *plĕzh'ûr*, agreeable sensations or emotions; enjoyment or gratification of the mind or senses; what the will dictates or prefers; preference; delight; choice; purpose; arbitrary will; that which pleases: V. in *OE.*, to please; to gratify. **Pleas'ureless**, a. *-lĕs*, devoid of pleasure. **Pleas'urable**, a. *-ă-bl*, delightful; gratifying; pleasing. **Pleas'urably**, ad. *-blĭ*. **Pleas'urableness**, n. *-bl-nĕs*, the quality of being pleasurable. **Pleasure-boat**, a boat to sail in for amusement. **Pleasure-ground**, ground adjoining a dwelling-house, laid out in an ornamental manner. **Please'man**, in *OE.*, an officious fellow; a pick-thank or flatterer.—Syn. of 'pleasant': agreeable; good-humored; pleasing; delightful; gratifying; grateful; cheerful; amusing; humorous; jocose; gay; enlivening; lively; merry; sportive; witty; facetious; nice; pleasurable; acceptable;—of 'pleasure': enjoyment; comfort; solace; satisfaction; delight; gladness; joy; purpose; command; intention; will; choice; approbation; preference.

PLEASONTON, *plĕz'on-ton*, **Alfred**: born 1824, June 7, Washington, D. C.: soldier. He graduated at the U. S. Milit. Acad. 1844; served in the Mexican war; was commissioned 1st lieut. 1849, capt. 1855, maj. of cavalry 1862. He served through the campaign in the Va. peninsula, and was commissioned brig.gen. of volunteers 1862, July. He commanded the cavalry division that harassed Lee's rear in the invasion of Md., was engaged at Boonsboro, South Mountain, and Antietam, and took part in the pursuit of the retreating enemy. By prompt and skilful action at Chancellorsville, he saved Hooker's army from disaster. He participated in all the actions preceding the battle of Gettysburg, and commanded all the Federal cavalry forces on that field. At Antietam he won the brevet of maj.gen. of volunteers, and at Gettysburg that of col. in the regular army. Transferred to Mo. 1864, he drove the Confederate forces under Gen. Price out of the state. He was brevetted brig.gen. and maj.gen. in the regular army 1865. He retired from the service 1868, and thereafter for several years was collector of internal revenue, and later pres. of the Cincinnati and Terre Haute railroad. He was placed on the retired list of the army, with the rank of col., 1888.

PLEAT, v. *plēt:* another spelling of **Plait**, which see.

PLEBEIAN, a. *plĕ-bē'ăn* [F. *plébéien;* L. *plebeius*, plebeian—from *plebs*, or *plēbem*, the common people of ancient Rome]: of or relating to the common people; low; vulgar: N. one of the common people. **Plebei'anism** n, *-ĭzm*, the conduct of the common people.—*Plebeians*, in anc. Rome, were the common people; one of the two elements of which the Roman nation consisted. Their origin, as a separate class, is traced partly to natural, partly to artificial causes. The foundation of Rome, probably as a frontier-emporium of Latin traffic (according to Mommsen's suggestion), would bring about the place a number of inferior *employés*, clients, or hangers-on of the enterprising commercial agriculturists, who laid the primitive basis of the material and social prosperity of the city. These hangers-on were the original plebeians, or non-burgesses of Rome, whose numbers were constantly increased by the subjugation of surrounding cities and states. Thus, tradition states that, on the capture of Alba, while the most distinguished citizens of that town were received among the Roman patricians, the greater part of the inhabitants, likewise transferred to Rome, were kept in submission to the *populus* or patricians of Rome—in other words, swelled the ranks of the plebeians. Similar transfers of some of the inhabitants of conquered towns are assigned to the reign of Ancus Martius. The order of plebeians, thus gradually formed, soon exceeded the patricians in numbers, partly inhabiting Rome, and partly the adjoining country. Though citizens, they were not comprehended in the three tribes, nor in the *curiæ*, nor in the patrician *gentes;* and were therefore excluded from the comitia, the senate, and all the civil and priestly offices of the state. They could not intermarry with the patricians.

The first step (according to traditionary belief) toward breaking down the barrier between the two classes was the admission, under Tarquinius Priscus, of some of the more considerable P. families into the three tribes. Servius Tullius divided the part of the city and adjacent country inhabited by plebeians into regions or local tribes, assigning land to those plebeians who were yet without it. The P. tribes, with tribunes at their head, formed an organization similar to that of the patricians. The same king further extended the rights of the plebeians by dividing the whole body of citizens, patrician and plebeian, into five classes, according to their wealth, and forming a great national assembly called the *Comitia Centuriata*, in which the plebeians met the patricians on a footing of equality; but the patricians continued alone eligible to the senate, the highest magistracy, and the priestly offices. These newly acquired privileges were lost in the reign of Tarquinius Superbus, but restored on the establishment of the Republic. Soon afterward the vacancies which had occurred in the senate during the reign of the last king were filled by the most distinguished of the P. equites, and the plebeians acquired a variety of new privileges by the laws of Valerius Publicola. The encroachments on those privileges on the part of the patricians began the long-continued struggle between the two orders, which eventually led to the plebeians gaining access to all the civil and religious offices, acquiring for their decrees (*plebiscita*) the force of law. Under the Hortensian law, B.C. 286, the two hostile classes were at last amalgamated in one general body of Roman citizens with equal rights. Thenceforth the term *populus* is applied sometimes to the plebeians alone, sometimes to the whole body of citizens assembled in the *Comitia Centuriata* or *Tributa;* and *plebs* is occasionally used in a loose way for the multitude or populace, in opposition to the senatorial party. See PATRICIAN.

PLEBISCITE, n *plĕb'ĭ-sĭt* or *-sīt* [F. *plébiscite*—from L. *plebiscītum*, an ordiance or decree of the people—from L. *plebs*, the common people; *scītum*, a decree—from *sciscĕre*, to ordain]: a vote taken of the whole male inhabitants of a country or town, who are of age, on any matter submitted to them for their decision; a vote by universal suffrage. The term has been applied in the political phraseology of modern France to a decree of the nation obtained by an appeal to universal suffrage. Thus, Louis Napoleon was chosen president, and subsequently emperor, by a P. The word is borrowed from the Latin; but the *plebiscitum* of the Romans properly meant only a law passed at the *Comitia Tributa*, i.e., assembly of the *plebs*, or 'commons,' as distinguished from the *populus*, or the 'nobles;' and though it was ultimately obligatory on both classes of the community, it, of course, could refer to such matters only as were within the province of the *Comitia Tributa*, and could not fundamentally alter or destroy the constitution.

PLECTOGNATHI, *plĕk-tŏg'na-thī:* in the system of Cuvier, and also in that of Müller, an order of osseous fishes, but having the skeleton less perfectly ossified than osseous fishes generally; the skin furnished with ganoid scales or spines; and characterized particularly by having the maxillary and premaxillary bones anchylosed or soldered together. The gill-lid and rays are concealed under the thick skin, with only a small opening. The ribs are very short, and there are no distinctly developed ventral fins. The fishes belonging to this order are not many. They are regarded as a connecting link between the osseous and the cartilaginous fishes. The P. include the Trunk or Box fishes (*Ostraciontidæ*), mostly tropical, 5 species found on the e. United States coast, one of these also Californian; the File-fishes (*Balistidæ*), chiefly tropical, 4 species as far n. as New England, one of which is named, from its color, the Orange File-fish (*Alutera Schœpfii*), called also Barnacle-eater, these fish having strong teeth to crush shells, and the name file referring to their rough skin; the Porcupine-fishes (*Diodontidæ*), the name especially of the spiny species, but the family including the Puffers, known also as Burr-fish, Ball-fish, Swell-fish, and Toad-fish, of which there are 4 Atlantic and 2 Pacific coast species; the Bellows-fishes (*Tetrodontidæ*), such as the common Swell-fish, or Egg-fish, from Cape Cod to the Gulf, and the Rabbit-fish, a straggler n. from the Gulf; and the Sunfishes (*Orthagoriscidæ*), pelagic, of extraordinary forms, some higher than long, as if all head, and the largest weighing 700-800 lbs. Other families and classifications are made.

PLECTOGNATHIC, a. *plĕk'tŏg-năth'ĭk*, or PLECTOGNATHOUS, a. *plĕk-tŏg'nă-thŭs* [Gr. *plektos*, twisted, knitted—from *plekō*, I twist; *gnathos*, the cheek]: having the cheek-bones immovably united with the jaws; applied to an order of fishes called the PLECTOGNATHES, *plĕk'tŏg-nāths* or *-nā'thēs*, including the trunk-fish, sunfish, etc.

PLECTRUM, n. *plĕk'trŭm* [L. *plectrum;* Gr. *plēktron,* a plectrum—from Gr. *plēttō,* I strike]: a small piece of metal, wood, or ivory, with which the ancients struck the lyre, or other stringed instrument.

PLED, v. *plĕd* [see Plead, under Plea]: another spelling of Pleaded; in *Scotch law,* argued or returned answer, as, 'he *pled* guilty.'

PLEDGE, n. *plĕj* [F. *pleige;* OF. *plege;* Dut. *pleghe,* duty or tribute: It. *pieggieria,* a surety, bail, pledge: L. *pignus,* a security]: anything deposited as security; surety; the deposit of a chattel or movable with a creditor in security of a debt; involving a contract between the parties that the pledgee shall keep the chattel till the debt is paid (see Pawnbroking): a promise solemnly given; a warrant given, as one's faith or word; a hostage: a drinking to the health of a person: V. to warrant; to deposit as security; to pawn; to engage by promise or declaration; to drink to the health of another. Pledg'ing, imp. Pledged, pp. *plĕjd:* Adj. deposited as a security; solemnly promised. Pledg'er, n. *-ėr,* one who pledges. To hold in pledge, to keep as security. To put in pledge, to pawn. To take the pledge, to become a total abstainer.—Syn. of 'pledge, n.': deposit; security; earnest; trust; pawn; gage; guarantee; surety; hostage; bail; warrant; promise.

PLEDGET, n. *plĕj'ĕt* [from Plug]: a small mass of dry lint laid over a wound.

PLEIADS, n. plu. *plī'ădz,* or Pleiades, n. plu. *plī'ă-dēz* [L. and Gr. *Plei'ădes,* the seven daughters of Atlas and Pleïone, said to have been placed by Jupiter among the stars; the sailing stars—probably derived from *plein,* to sail, because they rose at the beginning of the sailing season]: cluster of seven stars in the constellation Taurus. —The *Pleiades,* in Greek mythology, were, according to the most general account, the seven daughters of Atlas and of Pleione, daughter of Oceanus. Their history is related differently by the Greek mythologists: according to some, they committed suicide from grief, either at the death of their sisters, the Hyades, or at the fate of their father, Atlas (q.v.); according to others, they were companions of Artemis (Diana), and, being pursued by Orion (q.v.), were rescued from him by the gods by being translated to the sky; all authorities, however, agree that, after their death or translation, they were transformed into stars. Only six of these stars are visible to the naked eye, and the ancients believed that the seventh hid herself from shame that she alone of the P. had married a mortal, while her six sisters were the spouses of different gods. Their names are Electra, Maia, Taygete, Alcyone, Celæno, Sterope (the invisible one), and Merope.

In astronomy, a group or constellation of six stars placed on the shoulder of Taurus, the second sign of the Zodiac, and forming, with the pole-star and the twin Castor and Pollux, the three angular points of a figure which is nearly an equilateral triangle. Many believe, from the uniform agreement that the P. were 'seven' in number, that the constellation at an early period contained 'seven' stars, but that one has since disappeared—not a very uncommon occurrence.

The name *Poetical Pleiades* is frequently applied to reunions of poets in septenary groups; and this use of the word dates from the time of the Ptolemies—the originator of the first being Ptolemy Philadelphus, who, from the number of the Greek poets that flocked to Alexandria, chose out seven, whom he treated with special distinction, and denominated his *pleiad*. His example was followed by Charlemagne; and the same system was continued by the 'Compagnie des Sept Mantenadors del gay Saber,' or the 'Compagnie des Sept Troubadours de Toulouse,' till the 17th c. Such associations were valuable as promoting interchange of ideas and opinions by those eminent in the same department of letters, and creating a kind of *esprit du corps* among them.

PLEI'OCENE: see Pliocene.

PLEIOMAZIA, n. *plī'ō-mā'zhĭ-ă* [Gr. *pleiōn*, more; *māzŏs*, the breast]: an excess in the number of mammæ, rarely observed in men, more commonly in women.

PLEIOMORPHY, n. *plī'ō-mŏr'fĭ* [Gr. *pleiōn*, more; *morphē*, shape]: in *bot.*, the renewed growths in arrested parts of irregular flowers.

PLEIOPHYLLOUS, a. *plī-ŏf'ĭl-lŭs* [Gr. *pleiōn*, more; *phullon*, a leaf]: in *bot.*, applied to plants whose stems have no buds, and consequently no branches developed in the axils of the leaves. Pleiophylly, n. *plī-ŏf'ĭl-lĭ*, the condition of a plant in which there is an absolute increase in the number of leaves starting from one particular point, or in which the number of leaflets in a compound leaf is preternaturally increased.

PLEIOSAURUS: see Pliosaurus.

PLEIOTAXY, n. *plī'ō-tăks'ĭ* [Gr. *pleiōn*, more; *taxis*, arrangement—from *tassō*, I put in order]: in *bot.*, an increase in the number of whorls.

PLEIOTRACHEÆ, n. plu. *plī'ō-tră-kē'ē* [Gr. *pleiōn*, more; *tracheĭ'ă*, the windpipe]: in *bot.*, numerous fibres united together, as in the banana, and assuming the aspect of a broad ribbon; spiral vessels with several fibres united.

PLEISTOCENE, n. *plīs'tō-sēn* [Gr. *pleistos*, most; *kainos*, recent], or Newer Pliocene: terms introduced by Sir Charles Lyell to designate the most recent Tertiary deposits, whose organic remains belong almost exclusively to existing species. The terms, so far as now used, are applied to the Glacial or lower Quaternary or Post-tertiary. See Glacial Period: Quaternary.

PLENARY, a *plē'nă-rĭ* [mid. L. *plenarius*, entire; L. *plēnus*, full: It. *plenario*, plenary]: full; entire; complete. Ple'narily, ad. *-lĭ*. Ple'nariness, n. *-nĕs*, the state of being plenary. Plenarty, n. *plē'nâr-tĭ*, the state of a benefice or an office when full or occupied.

PLENIPOTENT, a. *plĕn-ĭp'ō-tĕnt* [L. *plēnus*, full; *potens* or *poten'tem*, powerful: Sp. *plenipotencia*, plenipotence]: possessing full power. PLENIP'OTENCE, n. *-tĕns*, the possession of full power. PLENIPOTENTIARY, a. *plĕn'-ĭ-pō-tĕn'shăr-ĭ* [F. *plénipotentiaire*, an ambassador]: having or containing full power: N. a person, particularly an ambassador, who is invested with full powers to negotiate a particular business or a treaty; a resident minister at a foreign court: see ENVOY: AMBASSADOR: EMBASSY: MINISTER (in Diplomacy).

PLENISH, v. *plĕn'ĭsh* [L. *plēnus*, full]: in *OE.*, to replenish; in *Scot.* (rare), to furnish a house; to stock a farm. PLEN'ISHING, n. household furniture; the stocking of a farm.

PLENIST, n. *plē'nĭst* [L. *plēnus*, full]: one who holds that all space contains matter. PLENUM, n. *plē'nŭm*, that state in which every part or space of extension is supposed to be full of matter—opposed to *vacuum*. PLENUS, a. *plē'-nŭs*, in *bot.*, double; applied to stamens and pistils which become petaloid; having a solid stem.

PLENITUDE, n. *plĕn'ĭ-tūd* [F. *plénitude*—from L. *plenĭtūdĭnem*, fulness, completeness—from *plēnus*, full: It. *plenitudine*]: fulness; abundance; exuberance; repletion.

PLENTY, n. *plĕn'tĭ* [OF. *plentet*, *plenté*—from L. *plenĭtas*, fulness, saturation—from *plēnus*, full]: abundance; copiousness; an adequate or full supply; state in which enough is enjoyed. PLENTEOUS, a. *plĕn'tĭ-ŭs* [OF. *plentivose*]: fully sufficient for every purpose; copious; abundant. PLEN'TEOUSLY, ad. *-lĭ*, abundantly; exuberantly. PLEN'TEOUSNESS, n. *-nĕs*, the state of being abundant. PLENTIFUL, a. *plĕn'tĭ-fûl*, copious; yielding abundance; fruitful. PLEN'TIFULLY, ad. *-lĭ*. PLEN'TIFULNESS, n. *-nĕs*, the state or quality of being plentiful; abundance.—SYN. of 'plenteous': copious; exuberant; abundant; plentiful; fruitful; fertile; ample; full.

PLENUS, a. *plē'nŭs* [L. *plēnus*, full]: in *bot.*, double, when applied to the flower: see also under PLENIST.

PLEOCHROISM, n. *plē-ŏk'rō-ĭzm* [Gr. *pleiōn*, more; *chrōs*, color of the skin]: the property of displaying different colors, when viewed in different directions or by transmitted light, as in certain minerals.

PLEONASM, n. *plē'ō-năzm* [Gr. *pleonas'mos*, superabundance—from *plĕŏs*, full]: an overfulness of words in speaking or writing; redundance of expression. PLEONASTIC, a. *plē'ō-năs'tĭk*, or PLE'ONAS'TICAL, a. *-tĭ-kăl*, pertaining to pleonasm; redundant. PLE'ONAS'TICALLY, ad. *-lĭ*.

PLEONASTE, n. *plē'ō-năst* [Gr. *plĕonas'tos*, abundant]: a dark or pearly-black variety of spinel, containing iron; a stone of considerable brilliancy when cut and polished.

PLEOSPORA, n. *plē-ŏs'pō-ră* [Gr. *plĕŏs*, full; *spora*, a spore, seed]: another name for 'Cladosporium herbarum,' a disease in silk-worms, caused by a fungus.

PLEROMA, n. *plē-rō'ma* [Gr. *plērōma*, that which fills, complement]: in *anc. gnosticism*, the boundless space, considered as the spiritual world, through which God, viewed as the purest light, is diffused, and in which are the æons. —In *scrip.*, P. means fulness; specially the plenitude of the Divine perfections.

PLEROME, n. *plē-rō'mĕ* [Gr. *plērōma*, fulness, complement—from *plērēs*, full]: the state of being filled up or completed; in *bot.*, the central portion of the primary meristem, immediately inclosed by the periblem, and giving rise to the fibro-vascular bundles.

PLESH, n. *plĕsh:* OE. for Plash, a puddle.

PLESIOMORPHOUS, a. *plē'zĭ-ō-mŏr'fŭs* [Gr. *plēsiŏs*, near to; *morphē*, form]: applied to crystallized substances whose forms closely resemble each other, but are not absolutely alike. Ple'siomor'phism, n. *-mŏr'fĭsm*, nearness of form.

PLESIOSAURUS, n. *plē'zĭ-ō-saw'rŭs* [Gr. *plēsiŏs*, near to; *sauros*, a lizard]: remarkable genus of fossil sea-reptiles, the species of which are found in the Lias, Oolite, and Cretaceous measures. Its remains are so abundant and so perfectly preserved, that we are as well acquainted with skeletons of many of its species as with those of any living animals. These represent a strange animal, the structure of which Cuvier considered the most singular, and its character the most anomalous, that had been discovered amid the ruins of former worlds. In the words of Buckland: 'To the head of a lizard, it united the teeth of a crocodile, a neck of enormous length, resembling the body of a serpent, a trunk and tail having the proportions of an ordinary quadruped, the ribs of a chameleon, and the paddles of a whale.' The limbs were covered with integument, so as to form simple undivided paddles, as in the turtle.

The supposed habits of the plesiosaur are thus described by Conybeare: 'That it was an aquatic, is evident from the form of its paddles; that it was marine, is almost equally so, from the remains with which it is universally associated; that it may have occasionally visited the shore, the resemblance of its extremities to those of the turtle may lead us to conjecture; its motion must have, however, been very awkward on land; its long neck must have impeded its progress through the water, presenting a striking contrast to the organization which so admirably fits the ichthyosaur to cut through the waves. May it not, therefore, be concluded—since, in addition to these circumstances, its respiration must have required frequent access to the air—that it swam upon or near the surface, arching back its long neck like the swan, and occasionally darting it down at the fish which happened to float within its reach ? It may perhaps have lurked in shoal-water along the coast, concealed among the sea-weed, and, raising its nostrils to the surface from a considerable depth, may have found a secure retreat from the assaults of dangerous enemies; while the length and flexibility of its neck may have compensated for lack of strength in its jaws, and its incapacity for swift motion through the water, by the suddenness and agility of the attack which they enabled it to make on every animal fitted for its prey which came within its reach.'

The remains of this animal were discovered first at Lyme Regis, England, 1822. Since then 22 species have been described, the specific differences resting chiefly on peculiarities in the form and structure of the vertebræ. Five or more genera closely related to P. are found in the Cretaceous deposits of N. America. A most remarkable form among these was the *Elasmosaurus*, 45 ft. long, with snake-like neck of more than 60 vertebræ.

PLESKOV: see PSKOV.

PLESSIS, *plĕs-sē′*, JOSEPH OCTAVE: 1763–1825, Dec. 4; b. near Montreal, Can.: Rom. Cath. archbishop. He was ordained priest 1786; appointed coadjutor to the bp. of Quebec 1801, whom he succeeded 1806. Being a strenuous maintainer of French-Canadian rights, his accession to the see of Quebec gave much offense to the English party in Lower Canada, and an unsuccessful attempt was made to prevent him from taking the oath of allegiance. Complaint lodged with the home govt. by Gov. Craig, 1810, resulted only in the recall of Craig: the new gov. conceded all P.'s demands. During the war of 1812 P. held his people fast in loyalty to England: his reward was a life-pension and a seat in the legislative council. Quebec became a metropolitan see 1818, and P. abp. Mainly through his exertions two attempts at effacing French-Canadian nationality—legislative union of the provinces, and a uniform system of schooling—were defeated 1822. The education law of 1824 was largely his work.

PLETHON, or PLETHO: see GEMISTUS.

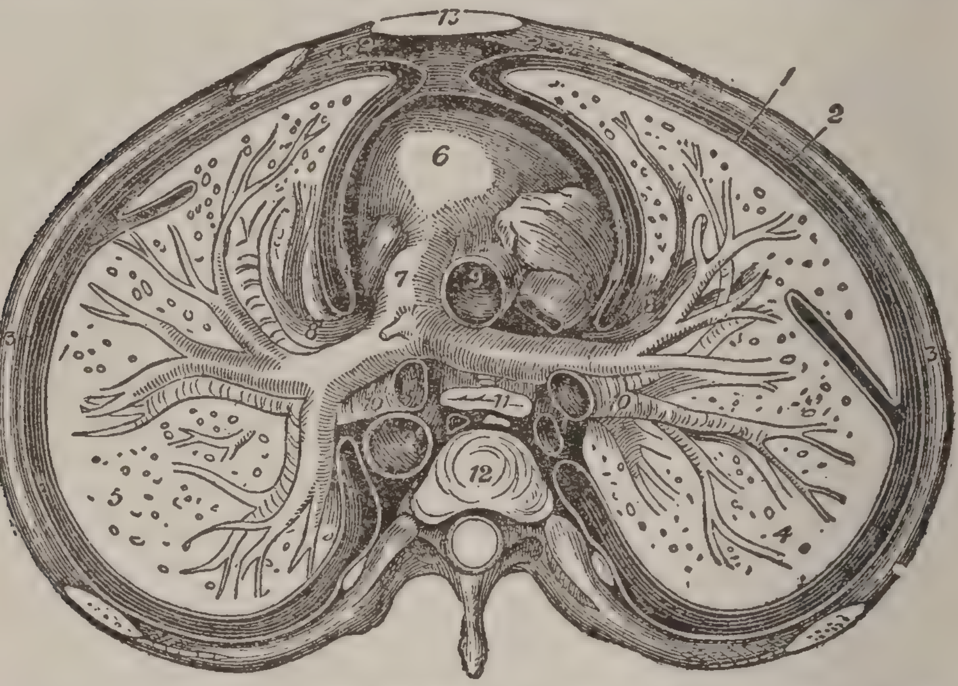
PLETHORA, n. *plĕth′ō-ră* [Gr. *plēthō′rē*, fulness—from *plēthō*, I am or become full]: redundant fulness of the blood-vessels; excess in the amount or quality of food and drink partaken of; a superabundance of anything, as, a plethora of wealth. PLETHORIC, a. *plē-thŏr′ĭk*, or PLETHORETICAL, a. *plĕth′ō-rĕt′ĭ-kăl*, having excess of blood.—*Plethora* designates a general excess of blood in the physical system. It may arise either from too much blood being made, or from too little being expended. The persons who become plethoric are usually those in thorough health, who eat heartily and digest readily, but who do not take sufficient bodily exercise, and do not duly attend to the action of the excreting organs. With them, the process of blood-making is always on the increase, and the vessels become more and more filled, as is seen in the red face, distended veins, and full pulse. The heart is excited and overworked; hence palpitation, shortness of breath, and probably a drowsy feeling may arise; but these symptoms, instead of acting as a warning, too often cause the abandonment of all exercise, by which the morbid condition is aggravated. The state of P. thus gradually induced may be extreme without any functions materially failing, and yet the subject is on the verge of some dangerous malady, e.g., apoplexy, or structural disease of the heart or great vessels, or of the lungs, kidneys, or liver.

P. is said to be *sthenic* when the strength and irritability of the muscular fibres (especially of the heart and arteries) are fully or excessively developed. This form commonly affects the young and active, and those of sanguineous nature. The blood is rich in red cells and fibrine; and there is a tendency to general febrile excitement, active hemorrhages, fluxes, and inflammation. A natural cure is thus often effected by the supervention of an attack of bleeding from the nostrils or from piles, or of mucous or bilious diarrhea. The P. is said to be *asthenic* [Gr. *a*, not; *sthenos*, strength] when there is a deficiency of contractility and tone in the muscular fibre. In this case, the heart and vessels, instead of being excited (as in sthenic plethora) by the augmented quantity of blood, are oppressed by its load, and cannot duly expel their accumulated contents. The face is purple instead of red; the extremities cold, and the excreting organs sluggish. This form affects persons weakened by age, excesses, or previous disease. It tends to produce congestions and passive hemorrhages, fluxes, and dropsies; and, if continued, structural changes, as dilatation of the heart, enlarged liver, varicose veins, etc.

In *sthenic* P., blood-letting is the first remedy, and this, with the continued use of aperient medicine and a sparing diet, is often sufficient for cure. If these means fail, recourse must be had to antimonials, salines, digitalis, and sometimes mercury or colchicum. In the *asthenic* form, Dr. Williams (see his article on 'Plethora,' in *Principles of Medicine*, for further details) observes that 'the continued use of alterative aperients and diuretics, such as mild mercurials, with rhubarb, aloes, or senna, salines and taraxacum, nitric acid, iodide of potassium, etc., may prepare the way for various tonics, such as calumba, bark, and iron.' He recommends also the use of certain mineral waters; first the saline, which are aperient and diuretic; afterward the chalybeate, which, though tonic, usually contain enough saline matter to keep the secretions free. Food may be taken more freely than in the sthenic form; and in both varieties, as much exercise in the open air should be taken as can be borne without exhaustion.

PLETHRON, n. *plĕth'ron* [Gr. *plēthron*]: in ancient Greece, a measure of length, being 100 Greek or 101 English ft., the sixth part of the stadium; as a square measure, 10,000 Greek sq. ft.; used also to translate the Roman jugerum, though this was about 28,000 sq. feet.

PLEURA, n. *plô'ră* [Gr. *pleura*, the side, a rib]: a serous membrane or sac covering each lung, and also lining the inside of the chest or thorax. PLEURÆ, n. plu. *plô'rē*, two independent serous membranes forming two shut sacs, quite distinct from each other, which line the right and left sides of the thoracic cavity, each pleura consisting of a *visceral* and a *parietal* portion. Each lung is invested externally by a very delicate serous membrane termed the *pleura*, which, after inclosing the whole organ, except at its root, where the great vessels enter it, is reflected upon the inner surface of the thorax or chest. That portion of the pleura in contact with the surface of the lung is called the



A transverse section of the Thorax, showing the reflections of the Pleura, and the relative position of the Viscera, etc. (From Gray's *Anatomy.*)

1, The visceral and, 2, the parietal layer of the pleura, on the right side; 3, 3, the ribs; 4, 5, section of the right and left lungs; 6, the heart; 7, the pulmonary artery, dividing into the right and left branches; 8, 8′, the right and left pulmonary veins; 9, 9′, the ascending and descending aorta, the intervening arch being cut away; 10, 10′, the right and left bronchi; 11, the œsophagus; 12, body of dorsal vertebra; 13, the sternum.

pleura pulmonalis, or visceral layer; while that which lines the interior of the chest is called the *pleura costalis*, or parietal layer; while the space intervening between these two layers is called the *cavity of the pleura.* Each pleura is a closed sac, quite independent of the other. The interspace between the pleuræ on the right and left side is termed the *mediastinum*, and contains all the viscera of the thorax excepting the lungs. The inner surface of each pleura is smooth, glistening, and moistened by a serous fluid; the outer surface is closely adherent to the surface of the lung, to the roots of the pulmonary vessels as they enter the lung, to the upper surface of the diaphragm, and to the walls of the chest. The lobes of the lungs are separated from one another by involutions or infoldings of the visceral layer; two such involutions—one on either side—are shown in the figure. The use of these serous sacs is much the same as that of the *Peritoneum* (q.v.); each pleura retains the lung and, to a certain extent, the greater vessels in position, while it facilitates, within certain limits, the movements of those parts essential to adequate respiration. Pleural, a. *-răl*, connected with the pleura. Pleurisy, n. *-rĭ-sĭ*, or Pleuritis, n. *-rī′tĭs*, the inflammation of the inner membrane of the thorax (see Pleurisy, below). Pleuritic, a. *plô-rĭt′ĭk*, pert. to or affected with pleurisy. Pleural cavity, sac of the pleura.

PLEURACANTHUS, n. *plô'ră-kăn'thŭs* [Gr. *pleura*, the side; *akan'tha*, a thorn or spine]: in *geol.*, a genus of fossil fin-spines, having a row of sharp hooks or denticles on each side.

PLEURAPOPHYSIS, n. *plô'ră-pŏf'ĭ-sĭs*, PLEU'RAPOPHYSES, n. plu. *-pŏf'ĭ-sēz* [Gr. *pleura*, the side, a rib; *apophŭsis*, the process of a bone]: a true rib.

PLEURENCHYMA, n. *plô-rĕng'kĭ-mă* [Gr. *pleura*, a side or rib; *eng'chuma*, juice, substance of organs]: in *bot.*, woody tissue, consisting of tough. slender tubes, out of which the woody parts are mainly formed

PLEU'RISY: inflammation of the investing membrane of the lung; one of the most serious diseases of the chest. It is very often, but not invariably, associated with inflammation of the *substance* of the lung, known commonly as *Pneumonia* (q.v). P. without pneumonia is much more common than pneumonia without P. When both are present, but P. preponderates, the correct term for the affection is *pleuro-pneumonia*, though it is frequently spoken of simply as pneumonia, since that is the more important of the two elements in the compound malady.

The pleura being a serous membrane, its inflammation is attended with the same course of events as described under the titles of the two allied diseases, *Pericarditis* and *Peritonitis.* The inflammation is of the adhesive kind, and is accompanied by pain, and by effusion of serum, of fibrinous exudation (the *coagulable lymph* of the older writers), or of pus, into the pleural cavity. In consequence of the anatomical relations of the pleura—one part of the membrane (the parietal) lining the firm walls of the chest, while the other part (the visceral) envelops the soft and compressible lung; and these opposed surfaces being freely movable on one another—it follows that very different effects may be produced by its inflammation. For example, the visceral layer may be glued to the parietal layer, so as to prevent all gliding movement between them, and to obliterate the pleural cavity (similarly to what often happens in *Pericarditis*, q.v.); or the two surfaces which are naturally in contact, may be abnormally separated by an infusion of serum between them; or from a combination of these results, the opposite surfaces of the pleuræ may be abnormally united at some points, and abnormally separated at others.

The general symptoms of P. are rigors, pain in the side, fever, difficulty and rapidity of breathing, cough, and an impossibility of assuming certain positions; and of these, the most marked is the pain or *stitch in the side*, the *Point de côté* of the French writers. From the prominence of this pain, which occupies a single spot, and is of a sharp, stabbing character, the Latin writers term pleurisy *Morbus lateris.* This spot is usually about the centre of the mamma of the affected side, or just below it; but why the pain should be usually restricted to that one small spot, when the inflammation pervades a considerable extent of surface, is not known. The pain is, however, felt occasionally in other parts—as in the shoulders, in the hollow of the armpit, beneath the collar-bone, along the breast-bone, etc. Cruveilhier observes that the pain sometimes affects the loins, and simulates lumbago; while Andral and Dr. Watson have directed attention to the fact that the pain often affects the hypochondrium, and may be readily mistaken for a symptom of peritonitis or (if on the right side) of hepatitis. The pain is increased by percussion, by pressure between the ribs, by a deep inspiration, by cough, etc.; and the patient is often observed to suppress a natural desire to cough, or never to draw more than a short and imperfect inspiration. The cough is not invariably present, though it is an ordinary symptom. It is small, suppressed as far as possible by the patient, and is either dry, or accompanied by the expectoration of slight catarrh. If much frothy mucus is brought up, it is a sign that Bronchitis (q.v.) also is present, and the appearance of rust-colored sputa indicates the co-existence of pneumonia. Although the above named symptoms, especially when most of them occur together, afford almost certain evidence of the existence of P., yet to the physician the physical signs are still more valuable, especially those furnished by percussion and auscultation.

P. far more commonly arises from exposure to cold than from any other cause, especially if a poisoned condition of the blood, predisposing to inflammation of the serous membrane, is present; but it may be occasioned by mechanical violence (e.g., by a penetrating wound of the thorax by the splintered ends of a broken rib, etc.), or by the accidental extension of disease from adjacent parts. The disease may terminate in resolution and complete recovery; or in adhesion, which often only causes slight embarrassment of breathing; or it may end with such a retraction of one side of the chest as to render the corresponding lung almost or totally useless; or it may cause death either directly by actual suffocation, if the effusion is very copious, and is not removed by tapping; or indirectly, by exhaustion. It is seldom, however, that simple P. proves fatal.

In acute P., in a robust and previously healthy subject, the physician, in some systems of practice, resorts to very strong measures, in the early stages. After the pain and fever have ceased, the physician's aim is to facilitate the absorption of the fluid by diuretics. The acute symptoms having subsided, the application of a succession of blisters to the affected side promotes absorption of the effused fluid; where the effusion is great or increasing, the patient should, as far as possible, abstain from liquids.

There has been considerable discussion as to how far the operation of tapping the chest, and letting out the fluid, is justifiable in this disease. The best authorities are of opinion that in simple pleurisy it ought never to be performed unless (1) the life of the patient is in immediate danger from continued pressure of the fluid in the sac; (2) unless all other means of getting rid of the fluid having failed, the patient is evidently losing strength daily; and (3) unless there is good reason to believe that the fluid consists of pus, in which case it should be let out. In all cases in which the operation is contemplated, a grooved needle should be introduced into the pleura. By this means, we not only ascertain the actual presence of fluid, but we discover its nature: if it be serous, it will flow readily along the groove, and trickle down the patient's side; if it be purulent and thick, a drop or two will probably be visible at the external orifice, and when the needle is withdrawn, its groove will be found to contain pus. The puncture thus made is quite harmless, and inflicts very little pain.

PLEURISY ROOT: see Butterfly Weed.

PLEURO-, prefix, *plô'rō-* [Gr. *pleuron*, *pleura*, a rib, a side]: pertaining or relating to the side or ribs.

PLEUROCARPI, n. plu. *plô'rō-kâr'pī* [Gr. *pleura*, a rib or side; *karpos*, fruit]: in *bot.*, mosses with the fructification proceeding laterally from the axils of the leaves. Pleu'rocar'pous, a. *-kâr'pŭs*, having the fructification springing from the axils of the leaves, or from the side of the stem.

PLEURODONT, n. *plô'rō-dŏnt* [Gr. *pleura*, the side; *odous* or *odonta*, a tooth]: in *zool.*, a term applied to certain saurians having teeth fixed by their outer sides to the sides of the jaw.

PLEURODYNIA, n. *plô'rō-dĭn'ĭ-ă* [Gr. *pleura*, the side or rib; *ŏdŭnē*, pain]: rheumatic or spasmodic pain in the side, arising from various causes. This affection of the intercostal muscles is characterized by acute pain in the side on taking a full breath or coughing, and by great tenderness on pressure. If it happens to be attended by slight febrile excitement, or by a cough, it is impossible to distinguish it from pleurisy, except by attending to the physical signs which characterize the latter disease. Cruveilhier maintains that 'pleurodynia is nothing more than adhesive pleurisy;' and in many cases of assumed pleurodynia, there is little doubt that the pain is due to old adhesions. The disease generally yields to local measures, such as blistering, or counter-irritation in a milder form by rubefacient liniments. A mixture of soap-liniment and chloroform rubbed over the affected part two or three times a day, often gives relief. In the more persistent cases, leeches may be applied with benefit.

PLEURON, n. *plô'rŏn* [Gr. *pleuron*, a rib]: the lateral extension of the shells of Crustacea.

PLEURONECTIDÆ, *plū-rō-nĕk'tĭ-dē:* family of fishes included in Cuvier's order *Malacopterygii*, but belonging to the order *Anacanthini* of Müller's system (see Malacopterygii), and remarkable for a character to which there is nothing similar in any other vertebrate animals, a lack of symmetry in the head, and for swimming not with the back uppermost, like other fishes, but with one side uppermost. The peculiar structure of the head adapts it to this mode of swimming, both eyes being on that side which is uppermost, as a result of transformation in early life, the young having the usual form and symmetry of fish. Some of the bones of the head become much distorted, but there is no lack of symmetry in those of the body. The sides of the mouth are unequal. The body is extremely compressed, whence the P. are popularly termed *Flat Fish;* the back and belly being mere edges fringed by the dorsal and anal fins. The pectoral fins are generally unequal, also the ventral fins, those of the lower side being smaller than those of the upper. The upper side is often brown, or of some darkish color, and variously marked; the lower side whitish. The color of the upper side generally corresponds so much with that of the bottom, close to which these fishes swim, that they readily escape observation; and on this chiefly they seem to depend for safety, though, when hard pressed, they raise themselves in a vertical position, and suddenly throw themselves upward and forward to some distance, but then resume their ordinary posture, and as close to the bottom as possible. Their ordinary swimming is by a kind of undulating movement. They swim with great activity. They have no air-bladder. They abound chiefly where the bottom is smooth, either muddy or sandy. All are sea-fishes, but some are very common in brackish water, ascend rivers, and can be kept in fresh-water ponds. Many are in great esteem for the table. The turbot, halibut, brill, plaice, and flounder are examples of this family. The Smooth or Christmas Flounder (*Pleuronectes glaber*), otherwise called Eel-back and Fool-fish, is found from Salem, Mass., to Belfast, Me.; and *P. stellatus*, known simply as Flounder. on the Pacific coast, sometimes weighing 8–20 lbs. The nearly allied *Psuedopleuronectes Americanus*, is the Common or Winter Flounder, known in New York as Sole.

PLEURO-PNEUMONIA, n. *plô'rō-nū-mō'nĭ-ă* [Gr. *pleura*, the side; *pneumones*, the lungs—from *pneō*, I breathe]: contagious disease affecting cattle; and one of the most dangerous maladies; a combination of pleurisy and acute pneumonia; called often the 'lung plague.' Among the first symptoms are a loss of appetite, extreme debility, feverish condition, dry cough, and diminished secretions. At a later stage there is shortness of breath, soreness of the lungs, appearances of severe pain, watery discharge from the nose, and either constipation or violent diarrhea. Treatment is of little avail, and as the disease is extremely contagious, should not be attempted. The animal attacked should be killed at once, its carcass deeply buried, the stable thoroughly disinfected, and the manure after being mixed with quicklime should be drawn to a field and immediately plowed into the ground with horses. The remaining animals of the herd should be either slaughtered at once, or rigidly quarantined at least 90 days, and should be made to breathe the fumes of sulphur a few minutes each day for several weeks. The feed and bedding in the stable should be promptly burned, and pastures in which sick animals have been kept ought not to be used for well ones for several months.

P. occurs at all seasons and under widely differing circumstances. Under favorable conditions it speads with great rapidity, and unless disinfection is very thorough the germs of the disease will remain in the stables long after the sick animals have been removed. Inoculation has been largely practiced as a preventive measure, but has been only partially successful. The disease has been known from early times on the great plains of central and n. Europe, but till a recent period it was confined to a small area. It appeared in Prussia 1802, Russia about 1824, Holland 1833, Gt. Britain 1841, the United States 1843, s. Africa 1854, and New Zealand 1864. The first case in this country was that of a cow brought from England and landed at Brooklyn. The disease spread to several towns on Long Island. Four Dutch cows, imported 1859, brought the disease to Belmont, Mass., whence it spread to other towns and, though the state govt. took measures for its suppression, was not eradicated for several years. Since that date it has appeared in various states, but always as the result of contagious infection, or importation. Measures to prevent the spread of P. in England have long been in force, but the losses which it has caused have been enormous. In 1890 the officers in charge were given increased power. They cannot only slaughter all animals actually or probably suffering from the malady, but can also destroy all which have been exposed to the contagion. In this country the efforts of the state authorities proving insufficient, the national govt. 1884 established for the purpose of eradicating this and other contagious diseases of animals, a Bureau of Animal Industry, which has rendered efficient service. Though P. still exists in some localities in the United States, it has been greatly restricted and now (1891) is well under control.

PLEURORHIZEÆ, n. plu. *plô'rō-rĭz'ē-ē* [Gr. *pleura*, the side: *rhiza*, a root]: in *bot.*, cruciferous plants having the radicle of the embryo applied to the edges of the cotyledons, which are called *accumbent*. PLEU'RORHI'ZAL, a. *-rī'zăl*, having the radicle applied to the edges of the cotyledons.

PLEUROTHOTONOS, a. *plô-rō-thŏt'ŏ-nŏs* [Gr. *pleurŏthĕn*, from the side; *pleura*, the side; *tŏnŏs*, tension; *teinō*, I bend]: applied to lateral convulsions, sometimes seen in cases of tetanus, the patient throwing himself from side to side; bent or stretched from one side.

PLEUROTOMARIA, n. *plô'rō-tō-mā'rĭ-ă* [Gr. *pleura*, the side; *tomē*, a notch or cutting—from *temnō*, I cut]: an extensive genus of shells, solid and few-whorled, apertures somewhat square, with a deep slit in the outer margins.

PLEV'IN: see REPLEVIN.

PLEXIFORM, a. *plĕks'ĭ-fawrm* [L. *plexus*, interwoven, twisted—from *plecto*, I twist; *forma*, a shape]: in the form of network; complicated; entangled.

PLEXIMETER, n. *plĕks-ĭm'ĕ-tėr* [Gr. *plēxis*, a striking, a blow—from *plēssō*, I strike; *metron*, measure]: in *med.*, the piece of ivory, india-rubber, or the like, placed over such parts of the chest or abdomen as it may be necessary to tap on to ascertain the state of the parts underneath; the fingers of the left hand are commonly used as a *pleximeter*: see PERCUSSION.

PLEXIOBLASTOUS, a. *plĕks'ĭ-ō-blăs'tŭs* [Gr. *plĕxis*, a plaiting; *blastos*, a shoot or sucker]: in *bot.*, applied to cotyledons that rise above ground in germination, but do not assume the appearance of leaves.

PLEXUS, n. *plĕks'ŭs* [L. *plexus*, twisted—from *plecto*, I twist]: in *anat.*, a network of vessels or nerves.

PLEYEL, *plī'ĕl*, IGNAZ: musical composer: 1757–1831; b. Rupperstahl, near Vienna. He studied music under Vanhall and Haydn, and made in early life an extensive tour in Italy, to hear the works of the best composers. In 1783 he was made *Capellmeister* of Strasburg Cathedral, and during the succeeding ten years composed most of the works on which his popularity rests. In 1791 he visited London, and composed there three symphonies. Two years afterward, during the frenzy of the French Revolution, he fell under suspicion, and in proof of his acquiescence in the new order of things, had to compose a musical drama for the anniversary of Aug. 10, which saved his life. After a long career in Paris as a publisher of music and pianoforte manufacturer, he retired to his estate near Paris, and there died. His compositions, consisting of quartets, concertantes, and sonatas, are full of agreeable melodies, sometimes light and trivial, but occasionally vigorous.

PLIABLE, a. *plī'ă-bl* [F. *pliable*, pliable—from *plier*, to fold or plait—from L *plicārĕ*, to fold: Gr. *plekein*, to weave: Ger. *flechten*, to plait: It. *piega*, a fold or plait]: that can easily be bent or folded; flexible; supple; easy to be persuaded. PLI'ABLY, ad. *-blĭ*. PLI'ABLENESS, n. *-bl-nĕs*, or PLI'ABIL'ITY, n. *-bĭl'ĭ-tĭ*, state or quality of being pliable; the quality of yielding to force or pressure without rupture; the quality of yielding to moral force or influence. PLIANT, a. *plī'ănt*, easily bent; readily yielding to force or pressure without breaking; easily yielding to moral influence; tractable; docile. PLI'ANTLY, ad. *-lĭ*. PLI'ANCY, n. *-ăn-sĭ*, the state of being pliant, in a physical or moral sense; easiness to be bent; flexibility.—SYN. of 'pliable': pliant; flexible; supple; limber; yielding.

PLICA, n. *plī'kă* [L. *plĭco*, I plait or knit]: in *bot.*, disease in plants, in which the buds, instead of developing true branches, become short twigs, and these in their turn produce others of the same sort, the whole forming an entangled mass; an undue development of small branchlets, giving rise to the appearance of large branches, as in birch and hornbeam. PLICA POLONICA, *pō-lŏn'ĭ-kă* [so named as peculiar to *Poland*, Lithuania, and Tartary]: in *human anat.*, disease of the scalp, in which the hairs become matted together by an adhesive and often fetid secretion, and which is prevalent in Poland, though it occurs sometimes in other countries. The hair on microscopic investigation is found infested with a fungus of the genus *Trichophyton*. The only treatment beneficial is removal of the hair, and strict attention to cleanliness; but as it is popularly believed in Poland that this affection affords a security from all other sickness and misfortune, it is often difficult to persuade patients to have recourse to these means. See Küchenmeister's *Manual of Parasites*, vol. ii., pp. 148–152. PLICATE, a. *plī'kāt*, or PLI'CATED, a. [L. *plĭcātus*, folded, knit]: plaited; folded like a fan; in *bot.*, regularly disposed, as in the vernation of some leaves. PLI'CATELY, ad. *-lĭ*. PLICA'TION, n. *-kā'shŭn*, a folding up; a doubling up; in *geol.*, a bending back of strata upon themselves.

PLIED: see under PLY.

PLIERS, n. *plī'ėrz* [F. *plieur*, a folder—from *plier*, to bend (see PLY)]: a kind of small pincers by which anything is firmly seized.

PLIGHT, n. *plīt* [W. *plygu*, to fold or bend: prov. F. *pleg*, a fold, a bending: connected with PLY, which see]: in *OE.*, a fold or plait: V. in *OE.*, to plait; to weave. PLIGHT'ED, a. interwoven.

PLIGHT, n. *plīt* [AS. *pliht*, danger, risk; *plion*, to risk, imperil: O.Dut. *plegen*, to experiment or try: Ger. *pflicht*, duty, oath—the same as PLIGHT, to pledge]: dangerous condition; distressed state; predicament; also in a good sense, as, in good plight.

PLIGHT, v. *plīt* [Ger. *pflicht;* Dut. *pligt*, duty: Dut. *pleghen*, to perform, to take care of]: to make a duty or obligation of a thing; to give as a proof of good faith; to pledge, as one's faith: N. pledge; gage. PLIGHT'ING, imp. PLIGHTED, pp. *plīt'ĕd*, pledged; formally promised. PLIGHT'ER, n. *-ėr*, one who plights or pledges. *Note.*—The two preceding entries seem to be intimately connected in their origin.

PLINLIMMON, or PLYNLIMMON, *plĭn-lĭm'on:* mountain mass with three chief summits, in Wales, on the boundary between Montgomery and Cardigan, 11 m. n.w. of Llanidloes; 2,481 ft. in height. The name P. is said to be a corruption of the Celtic *Pumlumon*, signifying Five Rivers, and to be due to the fact that five rivers have their source in this mountain: one of them is the Severn, and another the Wye.

PLINTH, n. *plĭnth* [Gr. *plinthos*, a brick or tile, the base of a pillar]: in *arch.*, the lower projecting square base of a column, pedestal, or wall. PLINTHITE, n. *plĭnth'īt*, a mineral of a brick-red color.

PLINY, *plĭn'ĭ* (C. PLINIUS CÆCILIUS SECUNDUS), called often PLINY THE YOUNGER: A.D. 61—about 115; b. at Novum Comum (Como); son of C. Cæcilius. He was young when he lost his father, and was adopted by his uncle, under whose care, and that of his mother, Plinia, and his tutor, Virginius Rufus, his education was prosecuted. Passionately devoted to literature, he wrote a Greek tragedy at the age of 13; studied eloquence under Quintilian; and became so famous for his literary accomplishments, that he acquired the reputation of being one of the most learned men of the age. His oratorical powers were considerable; in his 19th year he began to speak in the forum; and his services as an advocate before the court of the Centumviri and the Roman senate were in frequent request. He held numerous official appointments; served, while a young man, as *tribunus militum* in Syria, where he listened to the teaching of Euphrates the Stoic, and Artemidorus; was afterward *quæstor Cæsaris;* was pretor about 93; and consul 100, when he wrote *Panegyricus*, an adulatory eulogium of Emperor Trajan, and containing little information as to the author and his times. He was appointed, 103, propretor of the province Pontica, an office which he vacated in less than two years; and he also discharged the function of curator of the banks and channel of the Tiber. He was twice married, his second wife being the accomplished and amiable Calpurnia, granddaughter of Calpurnius Fabatus, and considerably younger than her husband, by whom she was much beloved. He had no children by either marriage.

Our knowledge of P. the Younger is derived mainly from his letters or *Epistolæ*, of which there are ten books. He collected them himself, and probably wrote many of them with a view to publication. They hold a high place in epistolary literature, and give us many interesting glimpses into the life of their author and his contemporaries. P. himself appears in them to considerable advantage, as a genial and philanthropic man, enamored of literary studies, and fond of improving his estates by architectural ornament. His ample fortune was liberally bestowed; and his slaves always found him an indulgent master. Infirm health impaired throughout life his constitution, which was naturally weak; but of the time or cause of his death we know nothing. Of the facts contained in his letters, however, the most interesting to us are those relating to the punishment of the Christians. Death appears to have been the penalty attached even to the confession of being a Christian; though the adherents of the faith admitted no other acts, on examination, than those of meeting on a fixed day before dawn, when a hymn of praise to Christ was sung, and taking an oath to avoid theft, adultery, breach of faith, and denial of a deposit. Nothing more unfavorable to them than this could be extorted by P. from two female slaves, reputed to be deaconesses, whom he put to the torture. P. having asked Trajan how he was to stop the spreading superstition, the emperor replied that no general rule could be laid down;

that he ought not to institute a search after persons supposed to be Christians; but if any were brought before him, and the charge was proved, they were to be punished, if still impenitent. The best ed. of P.'s *Panegyricus* and *Epistolæ* together, is that of Schaefer; of the *Epistolæ* alone, that of Gierig.

PLIN'Y (C. PLINIUS SECUNDUS), called often PLINY THE ELDER: author of the celebrated *Historia Naturalis:* A.D. 23—abt. 79; b. in n. Italy, either at Novum Comum (Como) or Verona. Como was certainly his family's place of residence, since he had estates in its neighborhood; his nephew, the Younger Pliny, was born there, and inscriptions relating to members of his family have been found near it. While young, he was sent to Rome, where his ample means and high connections secured him the best education. At the age of 23 he entered the army, and served in Germany as commander of a troop of cavalry under L. Pomponius Secundus, of whom, in later life, he wrote a memoir. He travelled over nearly all the frontier of that extensive province, visited the Cauci and the sources of the Danube, composed during the intervals of military duty his treatise *De Jaculatione Equestri,* and commenced a history (completed in 20 books) of the Germanic wars. On his return to Rome in 52 with Pomponius, he entered on the study of jurisprudence; but as his practice as a pleader showed no great capacity for the legal profession, he retired to his native place, where he spent the greater part of the reign of Nero in miscellaneous authorship. During this period he wrote his *Studiosus,* a treatise in three books on the training of a young orator from the nursery to his entrance on public life, and apparently intended to guide the education of his nephew; also his grammatical work, *Dubius Sermo,* in eight books. Shortly before Nero's death P. was a procurator in Spain, where, in 71, he heard of his brother-in-law's decease, and of his being intrusted with the guardianship of his nephew, Pliny the Younger, whom he adopted on his return to Rome before 73. Vespasian, the reigning emperor, whom he had known while serving in Germany, received him as one of his intimate friends; and at this period he completed, in 31 books, and brought down to his own time, the Roman history of Aufidius Bassus. His mode of study at this time was a model of systematic assiduity. When living in the busy world of Rome, he would begin his studies by candle-light in autumn at a late hour of the night, and in winter at one or two in the morning. Before daybreak he would call on the emperor, for whom he would proceed to execute various commissions; this done, he would return home, and resume his studies. A frugal meal would follow; after which he would, in summer weather, lie in the sunshine, and take notes or extracts from books read to him. The practice of jotting down important facts or observations was habitual with him, and he was often heard to say that there was no book, however bad, from which some good could not be got. A cold bath, followed by a light meal and a short sleep, occupied another interval, after which he would study till the *cœna,* or dinner-time. Even at this meal some book was read to him, on which he would make comments. When in his country residence, he studied nearly all the time, except when in the bath; and even then, while his attendants were performing the duties incident to that luxury, he would be listening to some one who read to him, or he would be dictating to his amanuensis. When on a journey he was never without a secretary at his elbow, provided with a book and tablets. By this mode of life he collected an immense mass of materials, from which he compiled his great *Historia Naturalis,* published about 77. No fewer than 160 *volumina* of notes were found at his death, two years afterward. The great eruption which, in 79, submerged Herculaneum and Pompeii was at its height when he was stationed off Misenum, in command of the Roman fleet. Eager to examine the phenomenon more closely, he landed at Stabiæ, where he was suffocated by the vapors caused by the eruption. He was, as his nephew tells us, corpulent and asthmatic, and succumbed the more readily. None of his attendants shared his fate.

Of all his works, only his *Historia Naturalis* has come down to us. It comprehends a greater variety of subjects than we now regard as included under that title: astronomy, meteorology, geography, mineralogy, zoology, botany, everything which is a natural or non-artificial product, finds a place. Even to this elastic interpretation of the term, he does not rigidly adhere; the work being interspersed with digressions on such subjects as human institutions and inventions, and the history of the fine arts. It is divided into 37 books—the first being a dedicatory epistle to Titus, with a table of contents of the remaining books; and it embraces, as we are told in the preface, 20,000 matters of importance, extracted from about 2,000 volumes. Its scientific merit is not great: there is little attempt at philosophical arrangement; the observations nearly all are taken at second-hand, and show small discrimination in separating the true from the false, or the probable from the marvellous. His meaning is often obscure, from his writing of things with which he was personally unacquainted, and from his having missed the true sense of the authors whom he cites or translates. But it cannot be denied that the work is a great monument of industry and research—most praiseworthy as having been constructed and completed amid the labor of other onerous undertakings, and amid the distractions of active official employment; and most valuable as supplying us with details on a great variety of subjects, as to which we have no other information. The best critical editions of the text are those of Sillig (8 vols. 1851–57), Ian (1854–63; new ed. 1875), and Detlefsen (1867–75). There are several editions of the text with French notes, one by Grandsagne, with notes by Cuvier and others (1829), one by Littré (1848–50). Pliny's work has been translated into almost all European languages.

PLIOCENE, or PLEIOCENE, a. *plī'ō-sēn* [Gr. *pleiōn*, more; *kainos*, recent]: in *geol.*, a name given by Sir Charles Lyell to a section of the Upper Tertiaries, because the organic remains found in it contain between 60 and 70 per cent. of living species; a greater proportion than exists in the older Miocene, though not so great as that found in the succeeding Pleistocene.

As usual at the close of geological periods, disturbances of the earth's crust had occurred. The Miocene epoch ended with an elevation of deposits on the Pacific, forming the coast range; an uplifting of the Rocky Mt. region, drying up the great Miocene lakes of the plateau, and contracting those of the great basin and of the e. slope (where the fresh-water Pliocene deposits were afterward accumulated), and so raising the Atlantic and Gulf border that Pliocene beds of limited breadth and depth were formed only in N. and S. Carolina, and perhaps in part the beds of Yorktown and N. J. The P. has been named the Sumter Period from a locality in S. C. In s. S. Dakota and n. Nebraska, the Miocene 'White River Group' of the Bad Lands region, is covered by 300–400 ft. of P. beds, called the 'Loup Group.' It has been described as 'the great cemetery of the P.,' affording the bones of 3 species of camel; a rhinoceros; a mastodon, smaller than the quaternary one; an elephant that continued into the next period; 5 species of horse (*Hipparion, Equus*, etc.); a tiger as large as the Bengal; a wolf larger than any living; also deer, musk-deer, fox, beaver, porcupine, etc. The *Hipparion parvulum* was of the size of a goat; the *Equus excelsus* as large as the domestic horse. Of birds, there were an eagle, crane, and cormorant. The Oregon P. had a rhinoceros and peccary of its own. The S. C. P. has yielded a stag and mastodon, besides shells now mostly tropical, such as Cypræa, Conus, Fasciolaria. The shells of the Pacific border are described in Whitney's Survey of California. At the close of the P., the Tertiary elevation of the Rocky Mts. had reached 11,000 ft.; the continent had reached its full breadth; the Gulf of Mexico had even before the P. retreated from its Eocene border at the mouth of the Ohio to its present limits; and the Eocene climate, warm-temperate to the Arctic regions, was approaching the glacial cold that followed the Pliocene.

The beds belonging to this period are very local. They have been noticed in several places in Europe, but have been studied chiefly in Suffolk, the only locality in which they occur in Britain. Here they cover the upper beds of the London Clay; and being composed of shelly sand, they have, like similar deposits, been used for fertilizing lands deficient in calcareous matter, and have received the local name 'Crag.' They are divided into the (1) Red Crag, 50 ft.; (2) Coralline Crag, 50 feet.

The Red Crag consists of beds of quartzose sands and gravel with a mixture of shells, mostly rolled, and sometimes broken up into sand. The whole deposit, with the contained fossils, has a deep ferruginous or ocherous color. It seems to have been formed in shallow water, whose currents have given it a very variable character, and frequently confused the stratification as in some modern sandbanks. The fossils have a boreal character. They consist chiefly of mollusca; but there have been found also the bones and teeth of large sharks, skates, and other fish, and the ear-bones of one or more true whales.

The Coralline Crag is generally calcareous and marly, consisting of a mass of shells and polyzoa, separated in some places by thin layers of hard limestone, and coral-like masses, which occupy the position in which they lived. It is easily distinguished from the Red Crag by its white color. It has been formed at greater depth and in more tranquil water than the newer deposit. The fossils have a more southern facies than those of the Red Crag, and indicate that they lived in an ocean with higher temperature. Among these southern forms are species of the genera Conus, Oliva, Mitra, Voluta, and Pyrula. The calcareous polyzoa are abundant and very beautiful; and several interesting forms of echini have been described. A few fossils of the same species as those in the London Clay have been found in this and the Red Crag; but these are believed to have been washed out of the inferior deposits. Searles Wood has obtained 345 species of testacea from the Coralline Crag, and 230 from the Red Crag, of which about 150 are common to both; about 70 per cent. of the newer division are recent, and about 60 per cent. of the older.

Pliocene deposits have been observed in the neighborhood of Antwerp and on the banks of the Scheldt, from which 200 species of shells have been obtained, two-thirds of which were already known from Suffolk. More than a half are recent species found in northern seas, and a few are still living in the Mediterranean. Similar deposits occur in Normandy. The low hills between the Apennines and the sea on each side of Italy are to a considerable extent formed of beds belonging to this period; and the marine strata of the seven hills of Rome are of the same age. Beds of a brackish-water origin, observed on the shores of the Caspian, Aral, Azof, and Black Seas, have been referred to this period.

PLIOHIPPUS, n. *plī′ō-hĭp′ŭs* [Gr. *pleiōn*, more; *hippos*, a horse]: a fossil horse found in the Pliocene beds, nearly allied to the recent genus.

PLIOSAURUS, or Pleiosaurus, n. *plī′ō-saw′rŭs* [Gr. *pleiōn*, more; *sauros*, a lizard]: genus of fossil sea-reptiles nearly allied to the Plesiosaurus, but having a very short neck, and comparatively a larger head. The jaws are furnished with stronger teeth, subtrihedral in cross section, with one side flattened, and bounded by prominent lateral ridges on the more convex side. The species are found in the Middle and Upper Oolite.

PLOC, n. *plŏk:* mixture of hair and tar for covering a ship's bottom.

PLOCARIA, *plŏ-kā'rĭ-a:* genus of *Algæ,* of the order or suborder *Ceramiaceæ,* having a cartilaginous frond, composed of large cells, as if jointed, and dividing into slender, tufted, and densely aggregated branches. *P. helminthochorton* is the CORSICAN MOSS of the apothecaries' shops, formerly of some reputation as a vermifuge, but now little used, and believed to have little efficacy. It is a small plant, with a filiform entangled frond, and grows on the shores of the Mediterranean. It has a strong, marine odor and a salt taste. It consists in great part of a vegetable jelly or mucilage, which renders it nutritious, and contains much chloride of sodium, sulphate of lime, and carbonate of lime. As sold in the shops, it is always much mixed with other algæ.—*P. tenax* is a small plant with filiform, branched, and somewhat gelatinous frond, much used by the Chinese as a glue. It is used in China as food also.—*P. candida* is used as food in the East: it is popularly called CEYLON MOSS. The frond is whitish and much branched, the branches long and somewhat clustered. It is exported to China from the islands of the Indian archipelago, forming a portion of the cargo of almost every junk. The Chinese make it into a jelly with sugar, and use it as a sweetmeat. It consists in great part of a vegetable jelly with considerable starch. It has been introduced into some western countries as a light and nourishing food for children and invalids, and is suitable particularly in irritation of the mucous surfaces.

PLOCE, n. *plō'sē* [Gr. complication—from *plekō,* I weave, I plait]: in *rhet.*, a figure by which a word is separated or repeated, by way of emphasis, so as not only to signify the individual thing denoted by it, but also its peculiar attribute or quality; as, his home is a home indeed.

PLO'CEUS: see WEAVER BIRD.

PLOCK, *plŏtsk* (Russ. *Plotzk*): government in n. Poland, bounded n. by Prussia, s.w. by Warsaw; 3,520 sq. m. About three-fourths of the people are Poles. Hills are in the north and on the banks of the Narew and Vistula, which with the Bug are the chief rivers. One-third of the surface is covered with forests, and there are many marshes and lakes. The inhabitants are engaged chiefly in agriculture, and in cattle and sheep breeding. Pop. (1880) 522,006; (1887) 600,662; (1897) 556,877.

PLOCK (Russ. *Plotzk*): town of Poland, cap. of the govt. of the same name on an elevation on the right bank of the river Vistula, 78 m. w.n.w. of Warsaw. Its principal buildings are the cathedral, built 961, the bishop's palace, theatre, etc. Agriculture, and export of grain to Danzig and other ports, are chief employments. Pop. (1885) 20,660; (1890) 23,568; (1897) 26,892.

PLOD, v. *plŏd* [Gael. *plod*, or *plodach*, a puddle: Ger. *pladdern*, to dabble or paddle: Dan. *pladder*, mire]: to travel or trudge slowly but steadily, as if through the wet, and over clods and mire; to work slowly or with laborious diligence; to toil heavily; to drudge. PLOD'DING, imp.: ADJ. diligent but slow; having the character of that which plods: N. slowness with steadiness and perseverance; the act of studying closely. PLOD'DED, pp. PLODDER, n. *plŏd'ĕr*, a dull, heavy, laborious man. PLOD'DINGLY, ad. *-lĭ*.

PLOJESHTI, *plo-jĕsh'tĭ*, or PLOYESTI, *plo-yĕs'tĭ*: town of Walachia, 35 m. n. by e. from Bucharest. It has considerable trade, and a great annual wool-fair. Pop. (1880) 33,000.

PLOMBIÈRES, *plōng-be-är':* town and watering-place in France, dept. of the Vosges, on the river Angronne; about 200 m. e.s.e. of Paris, 14 m. s. of Épinal. Plombières is frequented for its natural warm salt baths, esteemed from very ancient times. The waters are of varied qualities: there are cold ferruginous springs, tepid saponaceous, and hot saline; the first used as drinking water, the last two for baths. They are excellent for the skin and the urinary organs, and in gout, rheumatism, and paralysis. The Romans build bath-houses here, and royal personages have constantly patronized and improved the place. King Stanislaus of Poland, and Charles, Duke of Lorraine, built hospitals and laid out walks; but Emperor Louis Napoleon was the most munificent patron of P., and made of it probably the most ornate and perfectly equipped watering-place in the world. Permanent pop. 1,700.—Another P. is a small town in France (pop. 1,600), in the Côte-d'Or, 3 m. w.n.w. of Dijon, on the Lyons railroad.

PLONGÉE, *plawng-zhā'*, in Artillery and Fortification: a slope toward the front. Thus, in speaking of the course of a shell through the air, its plongée is from the point of greatest altitude to the point at which it strikes the earth. So, in fortification, the P. is the top of the parapet sloping gently toward the front. This slope is ordinarily 1 in 6; but a deviation is permissible between 1 in 9 and 1 in 4: the sharper the slope, however, the more liable is the crest of the parapet to be destroyed by an enemy's fire. Moreover, as flat a P. as possible is desirable, that sandbags may, when required, be laid upon it to form a cover for riflemen. See FORTIFICATION.

PLOT, n. *plŏt* [another spelling of PLAT, which see]: a small extent of ground; the ground occupied by a building; a plan or draft on paper: V. to make a plan on paper. PLOT'TING, imp.: N. the act or art of laying down on paper the several lines, angles, etc., of a tract of land that has been surveyed or measured. TO PLOT OUT, to lay out the ground for a design. PLOTTING-SCALE, a mathematical instrument used in plotting or setting off the length of lines.

PLOT, n. *plŏt* [a probable abbreviation of OE. *complot;* perhaps from Gr. *plĕkō;* L. *plĭco*, I twist or weave: comp. Bohem. *plot;* Pol. *ploty*, to braid hair]: the design of a future action; a secret scheme or design; a conspiracy; the knot or train of incidents developed in a story or a play; an intrigue: V. to plan or devise; to conspire against those in authority; to form a scheme of mischief affecting another. **Plot'ting**, imp.: Adj. contriving; forming an evil design: N. the act of contriving or forming schemes or evil designs. **Plot'ted**, pp. **Plot'ter**, n. *-ėr*, one who plots; an intriguer; a contriver or conspirator. *Note.*—Accident has appropriated *plan* to a design of open action, *plot* to one of secret machination—Wedgwood.—Syn. of 'plot, n.': stratagem; intrigue; cabal; conspiracy; contrivance; combination; scheme; plan; form; method; design.

PLOTINIAN, a. *plō-tĭn'ĭ-an:* belonging to or connected with the doctrines of the Plotinists.

PLOTINUS, *plō-tī'nŭs:* most original and important philosopher of the Neo-Platonic school: 205–270; b. Lycopolis in Egypt. Such was his utter philosophic indifference to things human, 'being ashamed almost to live in a body,' that he never would divulge even his parentage. He would never allow his birthday to be celebrated, though he gave feasts on those of Socrates and Plato; nor would he ever permit a painter or sculptor to perpetuate his features, or, as he called it, to produce the image of an image—the body being to him only a faint image of existence. He deemed it tedious enough already to have to drag about this image whithersoever he went in this life. His body was altogether contemptible in his eyes; he would see no physician in his illness, and was very sparing in the use of food, refraining from meat, often even from bread. Strangely enough, his desire for the study of philosophy did not arise within him before his 28th year, when he repaired to Alexandria, and there, after having sat at the feet of the great masters for some time without feeling satisfied with their teachings, he at last became acquainted with Ammonius Saccas, and in him found the desired teacher. For ten years he zealously attended his lectures, and though he had agreed, with two of his fellow-students, never to make known aught of Ammonius's teachings to the world, he yet became the chief representative and author of that school, less as a pupil than as an independent thinker, who taking his stand upon its theorems, developed them to their full extent. In 242 he joined Gordianus's expedition to Persia, in order to study the philosophy of India and Persia; but the emperor being murdered in Mesopotamia, he had to repair hurriedly to Antioch, whence, 244, he went to Rome. There his lectures were attended by crowds of eager youths, and by men and women of the highest circles. Not only Platonic wisdom, in Neo-Platonic garb, but asceticism and the charm of a purely contemplative life, were the themes on which he, in ever-new variations, and with extraordinary depth and brilliancy, held forth; and such was the impression that his earnestness made on his hearers, that several of them really gave up their fortune to the poor, set their slaves free, and devoted themselves to a life of study and ascetic piety. Dying parents intrusted their children and money to him, well knowing that an honester guardian, and one more anxious for his charges, could not be found. It is scarcely surprising to find that his contemporaries coupled with his rare virtues the gift of working miracles. Sixty years old, he thought of realizing Plato's dream, by founding an aristocratical and communistic commonwealth like the latter's 'Republic;' and Emperor Gallienus was ready to grant the site of two cities in Campania for his 'Platonopolis;' but his courtiers prevented the fulfilment of this promise. P. died at Puteoli, 66 years of age.

Although he began to write very late in life, he left 54 books of very different size and contents. His MS. being very carelessly written, he asked his pupil Porphyry to revise and correct it for him. The latter divided it into six principal divisions, each subdivided into nine books or *Enneads*. The most important parts are those which treat of Beauty, Fate, Immortality of Soul, the Good or One, the Three Original Substances, of Free Will, against Gnostics, of Providence, of the Genesis of Ideas, of the Influence of the Stars, of the Supreme Good, etc. The language is very unequal in the different portions, according to the mood and circumstances to which they respectively owe their existence; but it always is original, compact, and graphic in the extreme.

P.'s system was based chiefly on Plato's theorem of the Ideas; only that while Plato assumed the Ideas to be the link between the visible and the invisible, or between the Supreme Deity and the world, P. held the doctrine of Emanation, that is, the constant transmission of powers from the Absolute to the Creation, through several agencies, the first of which is 'Pure Intelligence,' whence flows the 'Soul of the World,' whence, again, the souls of 'men' and 'animals,' and finally 'matter' itself. (For fuller account of this part of P.'s system in its historical connection, see NEO-PLATONISM.) Men thus belong to two worlds, that of the senses and that of Pure Intelligence. It depends on each man, however, to which of the two worlds he will most direct his thoughts, and to which of the two he will finally belong. The ordinary virtues, e.g., justice, moderation, valor, and the like, are only the beginning and very first preparation of our elevation into the spiritual realm; purification, or the exercise of *purifying* virtues, is a further step, to which we attain partly through mathematics and dialectic; and the abandonment of all earthly interests for those of intellectual meditation, is the nearest approach to the goal. The higher the soul rises in this sphere of intellect, the deeper it sinks into the ocean of the good and the pure, until at last its union with God is complete, and it is no longer thought but vision and ecstasies which pervade it. These are a few snatches of P.'s philosophical rhapsodies, to which may be further added his mysterious belief in a kind of metempsychosis, by which souls, not sufficiently purified during life, return after death, and inhabit according to their bent, men, animals, and even plants. He further held views of his own respecting gods and demons, whom he divided into different classes, according to their degrees; and professed faith in Mantic, astrology, and magic, the conviction of whose truth he derived from his theory of the harmony in the intellectual world, reflected by the material world. Yet it is clear from his dicta on these subjects that he did not believe in these so-called sciences in the gross sense of the herd, but that he had a vague knowledge of those mysterious laws of attraction and repulsion which go through nature. P.'s philosophy, which sought to combine all the systems of Anaxagoras, Parmenides, the Pythagoreans, Plato, and Socrates, and the Stoa into one, was the last and boldest attempt of the ancient Greek world to explain the mystery of the creation and of existence. Its influence on modern philosophy is remarkable. From Spinoza to Schelling the reminiscences of P., irrespective of the drift of particular parts af their systems, recur constantly.

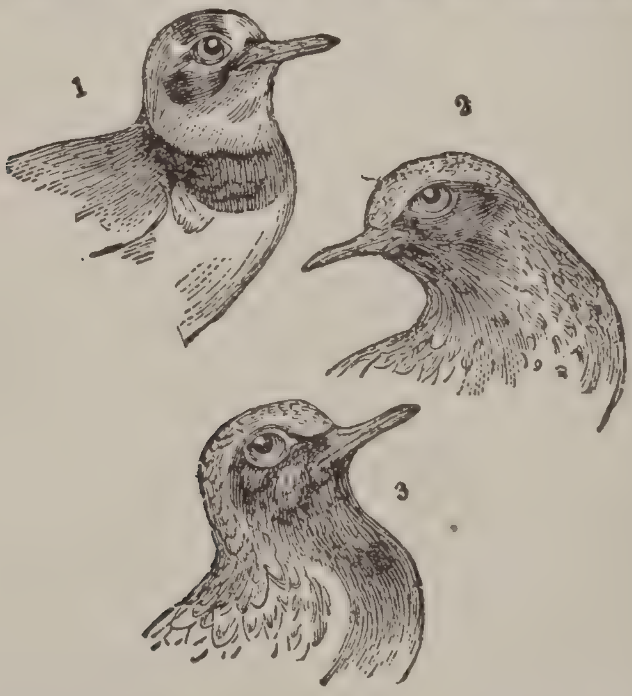
P.'s works were nearly forgotten, when Marsilius Ficinus first published a Latin paraphase of them (Florence 1492), followed by the *Ed. Pr.* of the original (Basel 1580 and 1615). The first critical ed., however, is due to Creuzer (Oxford 1835, 3 vols.). Others are those of Dübner (Paris 1855) and Kirchhoff (1856). Parts of his works were translated into German by Engelhard (1820); into English by Taylor (1794 and 1817); into French by Bouillet (1861). See Kirchner, *Die Philosophie des P.* (1854).

PLO'TUS: see DARTER.

PLOVER, n. *plŭv'ėr* [F. *pluvier;* It. *piviere,* a plover—from L. *pluviālis,* rain-bringing; *pluvia,* rain—so called in allusion to its alleged restlessness before bad weather]: bird of family *Charadriadæ* (q.v.), having a straight compressed bill; the upper mandible alone slightly inflated and slightly bent at the point; the nasal groove extending about two-thirds of the length of the bill, the nostrils longitudinally cleft near the base; the legs not very long, naked a little above the tarsal joint; the wings rather long and pointed, the first quill feather the longest. The species are numerous, and are found in every quarter of the globe; many are birds of passage. They frequent low moist grounds, where they congregate in large flocks, and feed on worms, mollusks, insects, etc.; but some visit mountainous regions and plains in the breeding-season. They fly with great strength and rapidity, and run with swiftness. The flesh and eggs of many of them are esteemed delicacies. The genus *Charadrius* has no hind toe. The AMERICAN GOLDEN PLOVER (*C. Dominicus*), known also as Field P. and Bull-head, is black above, speckled with yellow, usually with white also; below, brownish-black, or in winter grayish-white, the breast mottled; found in N. America generally, and a favorite game-bird. The European Golden P. is smaller with more yellow on the head. The Asiatic is similar; but, unlike both the above, has the wing-lining white; it occurs in Alaska. The genus *Squatarola* has a small hind toe; it is represented by the BLACK-

BELLIED P. (S. *helvetica*), called also the Swiss P., the Whistling Field P., or Ox-eye; spotted blackish and ashy-white above, black below; seen in autumn and spring, mostly coastwise. The genus *Ægialites* is not spotted above, nor extensively blackish below, but has dark rings on neck or breast. The KILDEER P. has two black rings (female and young, gray), bill black, rump chestnut; common in the w. especially; named from its cry. WILSON'S P. is sandy above, white below, no complete breast-bar; found coastwise. The rest have black-tipped yellow bills, e g., the RING P., or Semipalmated, web to second joint of middle toe; plentiful in autumn flocks on the coast. The PIPING P. (neck-band incomplete), e. of Rocky Mts., beyond which the SNOWY RING P. takes its place, with black bill and no complete collars. The genus *Podasocys*, large, long-legged, and no collars, includes the PRAIRIE or MOUNTAIN P., found on the w. plains to the Pacific.—The genus *Vanellus*, Lapwings, occurs only in Greenland; it is the European species. The SURF BIRD (well developed hind toe) belongs to the Pacific coast.

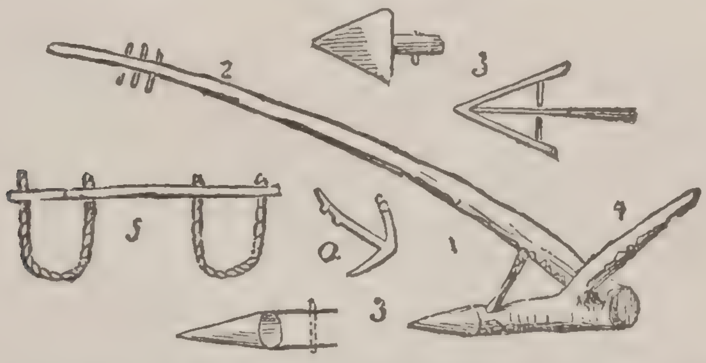
The EUROPEAN GOLDEN P. exhibits great restlessness on the approach of wet and stormy weather, whence its specific name *pluvialis*.—The RINGED P. (*C. hiaticula*), a much smaller bird, not so large as a song-thrush, is found on shores, frequenting sandy and shingly flats, from which the sea retires at ebb-tide. It is found in most of the northern parts of Europe and Asia, and in Iceland and Greenland. It is grayish-brown above, whitish beneath, with a collar of white round the neck, and below it a black—in winter, a brown—collar; a white bar on the wing Very similar, but smaller, is the KENTISH P. (*C. Cantianus*); and also similar and of similar habits is the smallest of the British species, the LITTLE RINGED P. (*C. minor*). To the genus *Squatarola* belongs the GRAY P. (*S. cinerea*). Another foreign species is the Dotterel (q.v.).



1, Ringed Plover; 2, Gray Plover; 3, Golden Plover.

PLOW, or **Plough**, n. *plow* [Dan. *plög*, a peg or stake; *plov*, a plow: Sw. *plig*, a peg, a stake; *plog*, a plow: Ger. *pflug;* Pol. *plug*, a plow: Ger. *pflock*, a peg: Gael. *ploc*, a block of wood, used as the original plow]: implement drawn by horses or oxen for turning up the soil of a field (see below): *figuratively*, agriculture or tillage; a bookbinder's tool for cutting the edges of books: V. to turn up the earth in a field with a plow; to furrow; to run through, as the sea in sailing; to cut or groove with a bookbinder's tool of the same name; in *Scrip.*, to labor in a calling. **Plow'ing**, imp.: N. the act or operation of tilling a field with a plow. **Plowed**, pp. *plowd:* Adj. turned up with a plow. **Plowable**, a. *plow'ă-bl*, that may be plowed; arable. **Plow'er**, n. *-ėr*, one who plows. **Plowboy**, a boy who assists in plowing; a country boy. **Plow-gate**, or **Plow-gang** [Scot. *gate*, or *gang*, a road or way]: as much land as can be tilled by one plow in a year, generally about 40 Scotch acres. **Plow-land**, arable land; as much land as a team can plow in a year. **Plowman**, one who holds or manages a plow; a rustic; a husbandman. **Plow-Monday**, the Monday after the Feast of Epiphany or the end of the Christmas holidays. **Plowshare**, n. *-shär*, the blade or iron plate in a plow which cuts the bottom of the furrow and raises a slice to the *mold-board*, which turns the earth over—the blade in front of the share is called the *coulter* [L. *culter*, a knife]. **Plow-tail**, the hind part of a plow. **To plow in**, to cover by plowing. **To plow on the back**, in *Scrip.*, to persecute or torment. **To plow with one's heifer**, in *Scrip.*, to obtain something from a husband by an application made through the wife. *Note.*—Plow is said by Max Müller to be connected with Skr. *plava;* Gr. *ploion*, a ship, which is as it were the plow of the sea; but this is somewhat fanciful.

PLOW, or **Plough**: one of the most important implements in agriculture. The time of its invention is unknown, but it was in use certainly at a very early period.

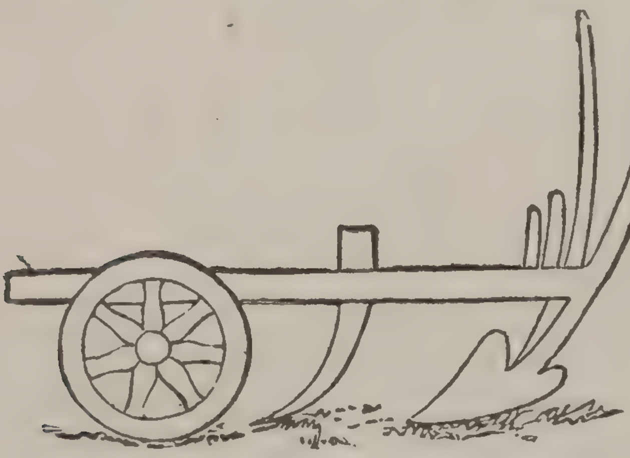


1, An ancient Plow; 2, its pole, where the oxen are attached; 3, shares of various forms; 4, the tail or handle; 5, the yoke; *a*, early Greek Plow.

It is mentioned in the Mosaic writings, as early probably as B.C. 1451; and figures on ancient monuments indicate that it was in common use in Assyria, Babylon, and Egypt in the early ages of the world. At first the P. was nothing but a crooked branch of a tree, with a sharp, projecting point. With some modifications, in many cases very slight, this style of P. was used for a long period. Even now in n. India, Morocco, and other partially civilized countries, the form of the P. is almost the same as it was in the olden time. In portions of n. Europe plows of extremely rude form and workmanship are still employed, and it is only a comparatively short time since improved plows in Great Britain and the United States superseded the clumsy implements of wood long in use.

The early Greeks had a P. which, though coarse and rude, was made in various parts, was furnished with wheels, and was a marked improvement over the original form. The Romans were an agricultural as well as a warlike people, and gave much attention to the construction of the P. and to the various purposes for which it could be used. They not only prepared the soil for reception of the seed by the use of the P., but they had forms of the P. for opening trenches in which to deposit the seeds of plants to be grown in rows, and other forms for covering the seed after it had been sown. On some of their plows they used mold-boards, while others were without them; the shares were made broad or narrow, according to the kind of land to be plowed; coulters were used on some forms and omitted on others; and they had plows with wheels and without them. They also made plows with shares having high and sharp tops for cutting the soil, an improvement sometimes credited to modern invention. At an early period in British history, special laws were made regarding plows and plowing. One of these enactments was to the effect that before a man should hold a P. he must learn how to make one. The driver was also required to make the

Egyptian Plow.



Roman Plow.

ropes of willow twigs, by which the P. was drawn. By one of these peculiar statutes, oxen were the only animals which could be used for drawing the P.; but at one period the Saxons used horses, which they fastened to the P. by the tail, a barbarous custom, which was finally prohibited by statute. Some of the plows used by the Saxons had wheels, but otherwise they were of very simple construction. The Normans also used wheels on some of their plows; but the inferiority of the work performed with them is attested by the fact that either the plowman, or some one by whom he was accompanied, carried a kind of hatchet with which to break the clods which the P. upturned. The Peruvians used rude plows drawn by several men, but most of the nations of antiquity used oxen for plowing. The horse is not mentioned in the Bible as used for this purpose, and as late as the middle of the 16th c. oxen were employed almost to the exclusion of other animals. At the present day, even in the countries in which agriculture has reached its most advanced position, oxen are largely used for plowing.

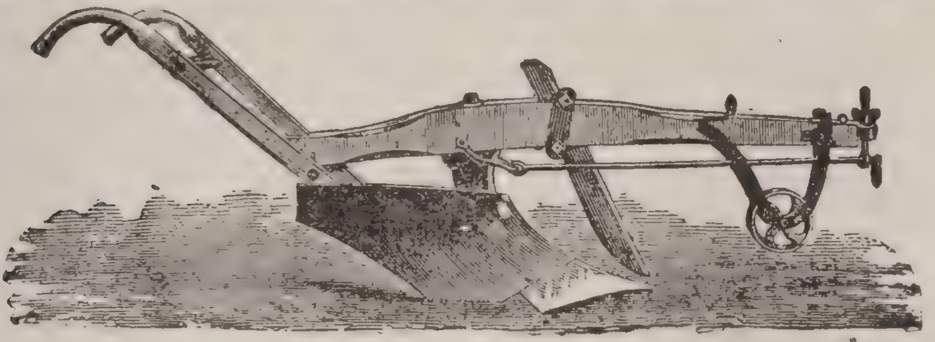
Modern Syrian Plow.

Notwithstanding the various changes and improvements in the style of the P., and in the methods of its construction, nothing approaching perfection was attained till toward the close of the 17th c., when the Dutch made important changes in its form. This model was taken to England, where it was still further improved. Under the direction of Walter Blythe, an agricultural author of considerable reputation, a P. was made at Rotherham, for which a patent was secured 1730, after it had been long in use. This implement was far superior to any previous model. It was called the Rotherham P., and though largely of wood, has been used till a very recent period. About 30 years after the patent was issued for the Rotherham P., James Small, of Scotland, invented the cast-iron mold-board, and succeeded in making a P. more nearly in accordance with mechanical principles than any of his predecessors had done. Till 1785 the share of the improved forms of the P. had been made of wrought-iron. In this year a patent was secured for making it of cast-iron, and 1803 the valuable improvement of case-hardening the under side of this portion of the P. was patented. The latter change allowed the upper portion of the share to wear away much more rapidly than the lower part, and thus caused the cutting part of the P. to be self-sharpening. The first cost of the share was also reduced, and there was great saving of the time required for making repairs. In some patterns the beam and larger portions of the handles were made of iron instead of wood, but this method has never come into universal use, and the best makers of the present day, while supplying both styles, sell many plows with wood beams and handles. An attempt to make a double P. was noted by Walter Blythe 1649, and at a little later date a form of subsoil plow was made by 'an ingenious young man of Kent.' But these, as well as all other styles, till a very recent period, were rude in construction and unsatisfactory in working.

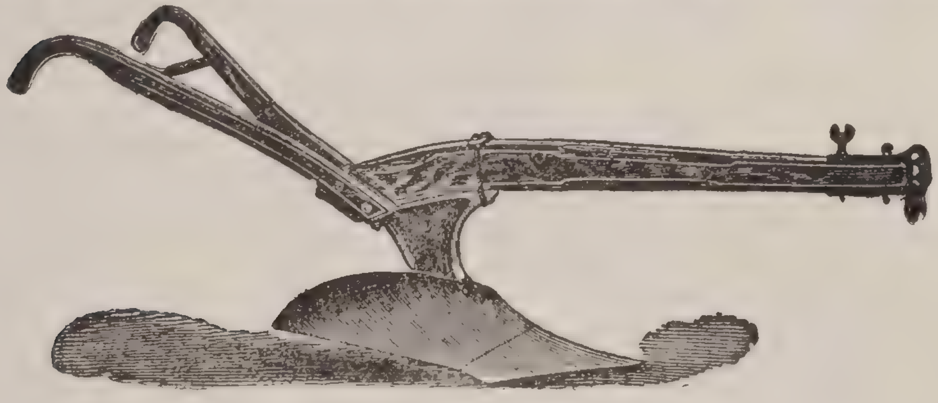
The plows used by the colonists of this country were poorly made, and very imperfectly answered the purpose for which they were designed. In 1617 the first plows brought from England to America were landed in Va. The Plymouth colonists did not have a P. for about 12 years after their settlement was made, and for a long period only a few plows were obtained. To avoid the expense of purchasing plows many farmers hired them of the few whose more ample means enabled them to own these implements. These plows were large and heavy, and a strong team, two men, and a driver, were required to use one with any success. The first plows manufactured in the colonies were not only of imperfect pattern, and largely of wood, but the metallic portion was of very inferior material. About 1788 Thomas Jefferson commenced a series of experiments, which he continued several years, with the hope of improving the form of the mold-board of the bull-tongue P. then in common use in Va., and there is reason to believe that his son-in-law, Col. Thomas M. Randolph, invented the first swivel P used in America. In 1797 Charles Newbold of N. J. obtained a patent for a cast-iron P. Minor changes were made by various parties, and about 1805 a style of P. was made with a steel-edged wrought-iron share, and a land-side and mold-board each of cast-iron. Jethro Wood of N. Y. made marked improvements 1819, and since that date there has been a rapid progress toward perfection of form and finish, and adaptation to the purposes of cultivation. Notwithstanding the progress of invention, the expense of the improved implements, the fact that the new styles of P. were at first sent out with very rough surfaces which it required considerable time to wear smooth and which it was difficult to polish in sticky soils, together with a natural reluctance on the part of many people to try new inventions in the agricultural line, made the introduction of the new models slow and difficult. Large numbers of plows made chiefly of wood, with the wearing surfaces covered with sheet-iron, were used in the United States till nearly the middle of the 19th century.

PLOW.

At the present time plows are made for a large number of special purposes, and of each principal division there are many forms. Each maker has his own patterns, and claims certain advantages for his styles over those of his competitors; though there are, of necessity, many points in which they bear a rather close resemblance. Certain parts are necessary to the construction of a P. which will work satisfactorily, and the possible range of variation in form and arrangement is not very wide. The essential parts of a common P. are the handles, beam, standard, share, land-side, mold-board, and a clevis (at the end of the beam farthest from the handles), to which the draught-chain or evener is attached. The various parts are fastened together with bolts. In some forms of the P. the point is an integral part of the share, in others it is cast separately. The P. for turning sod requires, in addition to the parts above named, a coulter, usually in the shape of a knife-blade, but sometimes circular. This cuts the turf, thus lightening the draught and insuring a furrow-slice of uniform width. In many cases a wheel, which can be raised or lowered, is attached in front of the coulter near the end of the beam. This aids in regulating the depth to which the P. will run, and also tends to steady its motion in the soil.



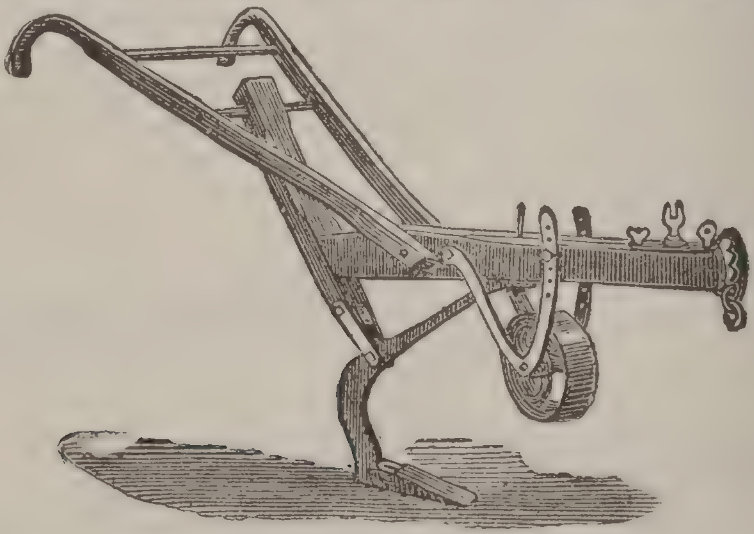
Sod Plow.



Stubble Plow.

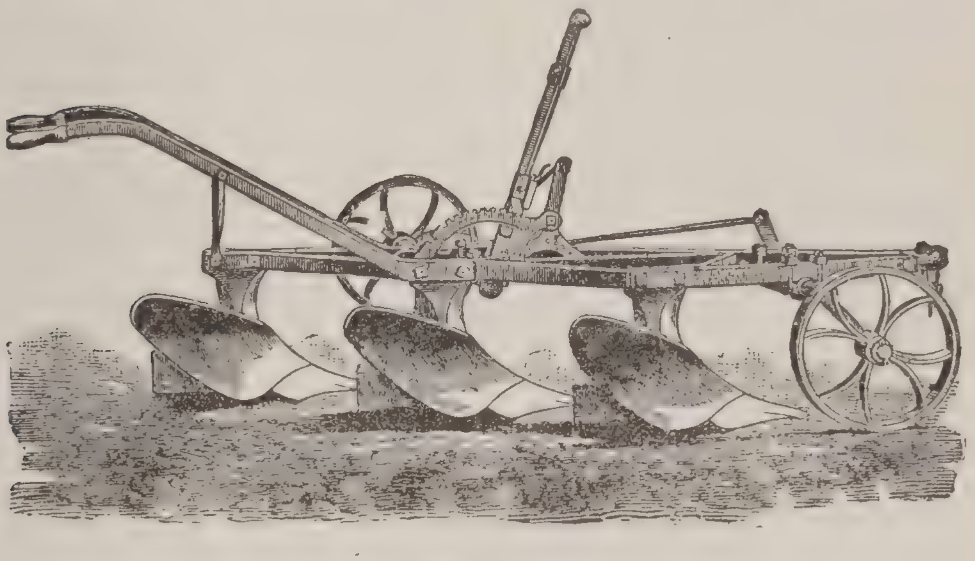
The P. is made either right-hand or left-hand. In the former case the mold-board is on the right-hand side and turns the furrow to the right. In the latter the mold-board is on the other side and the furrow is turned to the left. The majority of plowmen prefer the right-hand style.

The sod P. needs a long mold-board with a gradual turn in order to raise the furrow-slice easily and lay it over in a continuous strip. For stubble land, a P. with shorter mold-board and sharper turn is desirable, as this will insure more thorough loosening and pulverization of the surface soil, as well as its inversion. The form of the share also does much to modify the draught and to determine the degree of ease in managing the P. in the soil. If there are strong roots of grass or bushes in the ground, the share should be broad and be kept constantly sharp; but if there are many stones the form should more closely approach that of a wedge. On wet soil it is sometimes desirable to lap the furrows somewhat, in order to furnish room for the surplus water underneath the inverted sod, and also to hasten the decay of the turf. When the P. is not constructed specially for this purpose, the desired object can usually be secured by regulating the angle of the coulter and the width of the furrow. If the former is set nearly straight and the latter is about one-half greater in width than in depth—a matter which can be readily adjusted by moving the clevis, or in some plows by moving the beam to the right or the left on the standard to which it is fastened—the furrows will have a decided lap. But if the point of the coulter is set far forward and the width of the furrow is about twice its depth, the inverted sod will be laid very nearly level. Swivel plows, which by means of a reversible mold-board are capable of being used as either right-hand or as left-hand plows, were introduced many years ago. For a long time their use was confined to hilly land, and as by this style of P. the furrows all can be turned down the hill instead of half of them being turned up the slope as by the ordinary P., they were popularly known as 'side-hill' plows. Of late years great improvements have been made in their construction, and many of these plows are now used on level ground. By their use the 'dead,' or open, furrows which are made in the centre of a field which is plowed on both sides are avoided, as are also the ridges which occur where the first furrows are laid with the other style of plow. There is the added advantage of having the plowed portion of the field kept together as the work progresses, instead



Subsoil Plow.

of having it separated by an unfinished strip when the work is done by plowing around the field. The subsoil P. is used in heavy ground for loosening the soil beneath that portion affected by the ordinary implement. As the subsoil is usually much less fertile than the surface layer, it is not, in ordinary cases, desirable to bring it to the top; but loosening it to a depth of several inches below the bottom of an ordinary furrow enables the field to withstand much better than it otherwise could do the extremes of drought and moisture. The roots of the plants being thus enabled to pass through the entire surface soil, and also a portion of the underlying ground, have a greatly enlarged range. This P. is made without either share or mold-board; it is drawn usually by a team which immediately follows the one which opens the surface furrow, but a form combining in one implement the surface and the subsoil P. is sometimes employed. The trench P. runs to a much greater depth than the ordinary implement, but differs from the subsoil P. in that it brings to the surface a portion of the material which the former only loosens. One of the most popular implements of the kind was known as the Double Michigan P. Of the two plows which in this style were fastened to a single beam, the one in front cut and turned into the furrow previously made a thin layer of turf; while the second one, of greater size, rolled a large quantity of loose earth over the inverted sod. The heavy draught proved a strong objection to this P., and it has been largely superseded by what is known as the jointer—a double P. in which the first part is very small, and merely turns a narrow strip of the turf, which is covered by the large P. which follows. A P. with a mold-board on each side is often used for making trenches in which to plant potatoes or other crops, to throw loose earth toward growing plants, for opening water furrows, and for various other purposes. Special forms of the P. are made for ditching, making underground channels for water in clay soils, paring the turf in order to cut off the roots of weeds, reclaiming land containing stones and



Gang Plow.

bushes, and for other uses. There are also various implements known as pulverizers, and spaders, which are designed to answer with still greater efficiency the purposes of the P., though departing widely from the form of that implement. Among the great modern improvements in plows are the gang P., by which two or more furrows may be turned at one passage of the team, the implements being fastened to a single frame; and the sulky P., in which the implement is mounted on wheels, by which means the labor of the plowman is lightened, and the draught is greatly decreased.

The draught and the quality of the work performed by the P. depends very largely on the form of the implement. A slight change in the setting of the beam or the handles, in the length or curve of the mold-board, or in the form of the share, may greatly increase the draught, add to the difficulty of managing the implement, and to a still greater degree reduce its efficiency. A lack of proper adjustment of a P. which has been correctly made not infrequently leads to its condemnation. If the clevis is set so as to carry the P. too much to land, to cause it to cut too narrow a furrow, or to allow it to run too deep or too shallow, the work will be poorly done and the labor of the team and the man who holds the P. will be increased. Lengthening the draught-chain increases the labor of drawing the P. and causes it to take a deeper furrow. Raising the ring in the clevis has the same, and lowering it the reverse effect on the depth to which the P. will run. Turning the clevis to the right or left carries the P. to or from the land, and the same purpose is served by a slight right or left hand change in the position of the beam on the standard. As the point and edge of the share become worn the depth of the furrow is lessened. Raising the wheel at the end of the beam also allows a deeper furrow to be taken, while lowering it makes the furrow more shallow; but it is not well to make an adjustment that will bring a heavy pressure on the wheel. The wearing surfaces of plows are made of cast-iron, chilled iron or steel. Of these the first named is greatly inferior to either of the others. Among indispensable requisites of a first-class P. are strength, light weight, easy draught, correct form, and good workmanship. A P. which will run five to six inches deep should turn a furrow 9 to 12 in. wide; and one cutting seven to ten in. deep should turn a width of 14 to 18 inches. Plows taking smaller furrows are made to be drawn by one horse; for heavy teams large implements are made which will turn furrows two ft. wide, and there are many intermediate sizes.

Many efforts, some very successful, have been made to use steam as a motive power for the P.; but the great expense involved in obtaining an outfit, and the inconvenience of using it in a small field, have prevented its general introduced, though to some extent the steam P. is used in England, the Indies, and the western United States. As early as 1769, application for a patent for a machine to plow without animal power was made in England; and 1810 one was secured for a steam P. moved by two engines, one at each end of the field, the P. being drawn by an endless rope. This also had the system, used in later devices, of a double set of plows pointing different ways, one of which should work while being moved in one direction, and the other on the return trip—the set not in use being raised above the ground. In 1832 a patent was obtained for a steam P. propelled by a single engine, and having a carriage at the other end of the field, with which an endless rope to draw the P. was connected. Other patents were issued, and in 1864 John Fowler introduced a style of steam P. which was moved by two engines, at opposite ends of the field, and which was quite successful. Since that time these methods, in some cases slightly modified, have been employed. The single engine involves the least expense, but the outfit requiring two engines is more readily placed in position and economizes the power much better than the other. From two to eight furrows are turned at each passage of the P. across the field. Traction, or locomotive, engines to pass over the field and draw a gang of plows have been more recently patented, and are used to some extent in England and in a few of our w. states. Though plowing by steam in this country has only recently passed the experimental stage, engines and plows are now so well constructed and so fully adapted to the work required, that their extensive use on the large farms at the w. in the near future can be confidently predicted. During the last three

Steam Plow.

or four years these plows have proved their usefulness and greatly increased in popularity. Where the ground is nearly level, reasonably free from stones and other obstructions, and is in a moderately fair condition for working, the steam P. is very successful. Among its advantages are rapidity of performance; economy, when large fields are to be plowed; and the ability to give deeper and more thorough tillage than can be effected by less powerful means. Besides, the greater speed with which the work can be performed makes it often possible to wait for the ground to dry if too wet, or to delay for rain when it is too dry and hard to be easily plowed. If important to work it at once, the land can be broken by a steam P. when in a condition which would utterly preclude the use of horse-power. A ten-horse power traction engine will draw a gang of four 14-inch plows in a stiff, dry sod, and will readily carry a gang of five such plows in ordinary land. With such an engine, running at a speed of 2½ m. an hour drawing four 12-inch plows, 1⅕ acres can be plowed per hour; with five 12-inch plows, 1½ acres; with four 14-inch plows, 1⅖ acres; and with five 14-inch plows, 1¾ acres. The gangs are so constructed that one of the plows can be removed when, on account of unusual hardness of the ground or a desire to give deeper tillage, it is important to lighten the draught. The plows are readily adjusted to width and depth of working, and the only attention that they then require is to throw them in and out of the furrows at the end of the field. This is readily done by one man, another can easily attend to the engine, while a boy and team can bring water and fuel. The plows are made right or left hand according as the guiding-wheel of the engine is on the right or left side. The engines are so constructed that they can be used for driving threshers, saws, ensilage cutters, and other farm machines, as well as for plowing.

The purpose for which the P. is used is not limited as has sometimes been supposed, to a more or less perfect inversion of the surface soil, but has a much wider and more important range. By this inversion the sod and weeds growing upon the surface are covered so as to be out of the way in cultivation of the crops, and by their decay they furnish food for plants. The turning to the surface of some of the lower strata of the soil is beneficial also in bringing within their reach soluble elements of fertility which had settled so low as to be out of the reach of the roots of young plants. But, in addition to all this, one of the principal objects to be secured by the use of the P. is the pulverization of the ground, by which means the plant roots are enabled to pass more freely through the soil, the plant food contained in the land is made finer, and thus brought into better condition for use, and a much larger quanity of the soil is exposed to the disintegrating action of the weather, by which means elements of fertility previously locked in the ground are liberated and made available for the use of plants. By the judicious use of the P.

it is possible also to gradually deepen the soil and thus considerably increase its productive capacity.

Though the P. is an invaluable implement for performing the heavy work of tillage, it is not sufficient of itself to put the land into the best possible condition for receiving the seed, or to give the kind and degree of cultivation which the growing crops require. For these purposes it must be followed by the Harrow (q. v.), cultivator, or other implements of tillage.

PLOYE, a. *plwâ-yā'* [OF. *ployer*, to bend, to ply]: in *her.*, bowed and bent.

PLUCK, v. *plŭk* [Dut. *plucken;* Dan. *plukke*, to pick, to gather: Sw. *plocka;* Ger. *pflücken;* AS. *pluccian*, to pluck]: to pull with sudden force; to pull off, out, or up; to snatch; to reject a candidate for a university degree through his not being able to pass the necessary examinations: N. [probably so called because they are *plucked* out of the animal after death]: the heart, liver, and lights of an animal. PLUCK'ING, imp. PLUCKED, pp. *plŭkt:* ADJ. rejected in an examination; stripped of feathers or hair; robbed by sharpers. PLUCK'ER, n. *-ėr*, one who. CROW TO PLUCK, a dispute to settle; a complaint to make. TO PLUCK DOWN, to pull down; to demolish; to reduce to a lower state. TO PLUCK UP, to tear up by the roots; to eradicate.

PLUCK, n. *plŭk* [from PLUCK 1, in the sense of the 'heart,' the principal part of that named 'the pluck,' being the seat of courage]: courage; spirit; bravery. TO PLUCK UP ONE'S HEART, to begin to act boldly and courageously; no longer to give way to despondency or despair.

PLUG, n. *plŭg* [Dut. *plug*, a bung or peg: Ger. *pflock*, a plug: Sw. *pligg*, a peg: Fin. *pulkka*, a peg, a wedge: Gael. *plucadh*, to plug; *ploc*, a bung]: a piece of wood or other substance used to stop a hole; a stopple; a large peg: V. to stop with a plug; to make tight by stopping up a hole. PLUG'GING, imp.: N. the introduction of a mass of lint or other substance into the cavity of a wound to stop bleeding; the substance thus used. PLUGGED, pp. *plŭgd.*

PLUM, n. *plŭm* [Ger. *pflaume;* AS. *plúme*, a plum—from L. *prunum*, a plum]: a well-known fruit containing a nut, which, when dried and preserved, is called a *prune*, the tree itself being the *Prunus domestică*, ord. *Rosācĕæ* (see below): a raisin: in *familiar slang*, a handsome fortune. PLUM'CAKE, a sweet cake containing raisins, currants, and spice. PLUM-PUDDING, a pudding containing raisins or currants, or both. PLUM'MY, a. *-ĭ*, containing plums, or resembling plums. PLUM-PUDDING-STONE, a term originally restricted to a conglomerate of flint-pebbles, polished sections of which had a fancied resemblance to the fruit in a slice of plum-pudding—now loosely applied to any conglomerate.

PLUM (*Prunus*): genus of trees and shrubs of nat. order *Rosaceæ*, suborder *Amygdaleæ* (q.v.), or *Drupaceæ;* the species of which have the bell, or urn-shaped, 5-cleft calyx deciduous, and the drupe fleshy, with a bony stone. Among N. American native species are the WILD YELLOW or RED P. (*P. Americana*), leaves ovate, coarsely or doubly serrate; common in the west especially, where it is cultivated much, other fruit of the kind not succeeding well on the prairies; its fruit varies greatly in color and size, is sometimes an inch in diameter and of pleasant flavor.—The CHICKASAW P. (*P. Chicasa*) has narrow, finely serrate leaves, and globular fruit; it is found from Md. to Ill. and s.w., and probably is not indigenous.—The BEACH P. (*P. maritima*) is a shrub; fruit globular, purple or crimson, with bloom; it grows on the coast from Me. to Va., and a variety further south. The other wild species of Prunus are called Cherries, which they resemble in bud folding, little or no bloom on fruit, and some in the globular stone. The old world Plums have bud-leaves convolute, and stone flattened and acute. The Common P., the Bullace, and the Sloe, have been reckoned by botanists as distinct species, though with much doubt if they are really distinct, as the P. passes into the Bullace, and the Bullace into the Sloe by insensible gradations; though there is so wide a difference in general appearance, size of leaves, and size as well as quality of fruit, between the best cultivated plums and the sloe, that it is difficult to consider them as springing from a common stock. The COMMON P. (*P. domestica*) appears in a wild state in woods and hedges in many parts of England and on the continent of Europe, and inroad sides and waste places from New England to Penn., probably, however, often derived from the seeds of cultivated trees. It is commonly described as destitute of spines, and as further differing from the bullace in having the under-side of the leaves smooth, except when very young; but if these characters are adopted, many of the cultivated plums must be referred to the bullace (*P. insititia*) as their original; nor does the ovate fruit afford a more certain character, some of the finest garden plums being globose or nearly so, like the bullace. The varieties called Damson (q.v.) are particularly like the bullace, except in the form of the fruit. Cultivated plums vary greatly in the size, form, color, and flavor of the fruit. The fruit of some varieties, e.g., the *White Magnumbonum*, is two inches long; while damsons of the same shape are not quite one inch, and a single fruit of the one is equal to at least eight or ten of the other. The best varieties of P. are delicious dessert fruits; among these, the *Green Gage* (*Reine Claude* of the French) is one of the most esteemed; and is unsurpassed in sweetness and flavor. The inferior varieties are used in pies, conserves, and sweetmeats: some are very austere. In moderate quantity, plums are wholesome; but excess in the use of them is apt to produce colic, diarrhea, and cholera. The danger is greater if they are eaten before being perfectly ripe. A very pleasant wine is made from plums; and in parts of Europe a strong spirit is distilled from them after fermentation; but for this purpose they are mixed in s. France with honey and flour, and in Hungary with apples.—The dried fruit, variously known as *Dried Plums*, or *French Plums*, and *Prunes*, is much used for dessert; and the somewhat austere fruit of the *St. Julien Plum*, cultivated in s. France, becomes, when dried, the medicinal prune, used as a mild laxative. See PRUNES.

The P. is grown over a wide area and in great diversity of soils and climates. Deep and rich clays and loams are more favorable than sandy soils, though some varieties are specially adapted to the latter. Choice kinds are largely propagated in this country by budding on imported stocks, though many nurserymen grow their own stocks from the seeds of the Horse P., or of some other strong growing variety. Propagation can be effected also by means of layers. The seedling plants are budded or whip-grafted when one or two years old, and placed in the nursery rows. Two years later the rapid-growing sorts will be large enough to set in the orchard, but some varieties require more time. Standard trees are to be set 12 to 20 ft. apart each way, according to the vigor of the variety planted, but dwarfs can be planted 8 to 10 ft. apart. Shallow cultivation, if not too late in the fall, is beneficial, and in the case of young trees is of great importance. The land should be kept in high fertility by use of well-rotted manures, or commercial fertilizers. While the trees are young, pruning will be required to keep the heads well rounded and prevent excessive growth of single shoots. A large part of this work can be done by pinching back the ends of the twigs and rubbing out superfluous buds. Fruit is produced on spurs from wood at least two years old, and these should remain productive for a long period. If the conditions are favorable and the trees are well cared for, fair crops of fruit should be obtained in five years from planting, and the trees should remain in bearing 50 years. In rich land P. trees often show tendency to overbear. When this occurs, the fruit should be thinned as soon as it is one-fourth in. in diameter. Though their differences are not sharply defined, our cultivated plums may be divided into three general classes: the yellow or green, the purple, and the red. Among the best varieties in the first class are the Green Gage (of which there are numerous worthless imitations), and the Imperial Gage; in the second class, the Lombard, and the Bradshaw; in the third class, Pond's Seedling and Victoria (Sharp's Emperor). The quality is greatly improved by allowing the fruit to ripen fully on the tree, but this cannot be permitted when distant markets are to be supplied. As the fruit ripens unevenly, it will be necessary, in order to secure the crop in the best condition, to go over the trees several times.—The principal enemy of the P. is the curculio, or P. weevil (see WEEVIL) (*Conotrachelus nenuphar*), which attacks also the peach, cherry, and other fruit. It commences its depredations when the fruit is not larger than a pea. The full-grown insect feeds on the fruit and leaves but does its principal injury by puncturing the fruit and laying its eggs in the cavities thus formed. The egg hatches in about five days, and the larva eats the interior of the fruit, thus causing it to fall. The larva then enters the ground, where it undergoes transformation and becomes a perfect insect. In many places the ravages of this pest have been so great as to cause the general abandonment of P. culture. Of the large number of remedies which have been proposed, probably the most efficient is the jarring of the trees every morning, and catching, on sheets spread underneath, the beetles and defective fruit which are shaken down, and which are then to be destroyed. This treatment must be commenced as soon as the fruit is formed, and be continued three or four weeks. In recent years spraying with arsenical mixtures has been tried with some success. By destroying the infected specimens which fall to the ground, poultry or swine kept under the trees will greatly reduce the evil which would otherwise be caused.

The chief disease to which the P. is subject is the black knot. It is probably of a fungoid nature, and it proves terribly destructive. The only remedy which will be of the slightest avail is the cutting out of every particle of the diseased wood. This should be done as soon as the disease appears, and the wound should be washed with a chloride of lime solution, and afterward covered with grafting-wax. The diseased wood should be burned, and no grafts or buds for propagation should be taken from a tree in which the disease has appeared. Good cultivation, and the use of manures containing phosphoric acid and potash, with a fair supply of nitrogen, will tend to keep the trees in vigorous condition, and to prevent this disease.—The wood of the P.-tree is hard and fine-grained, and is used in cabinet-work, in turnery, and for musical instruments.—The Cashmere P. (*P. Bokharensis*), cultivated in Cashmere and Bokhara, is regarded as a distinct species.—The Cherry P., or Myrobalan P. (*P. cerasifera*, or *Myrobalanus*), is a bush very similar to the sloe, with pendulous globular red fruit. It is a native of N. America, but is often cultivated in Europe.

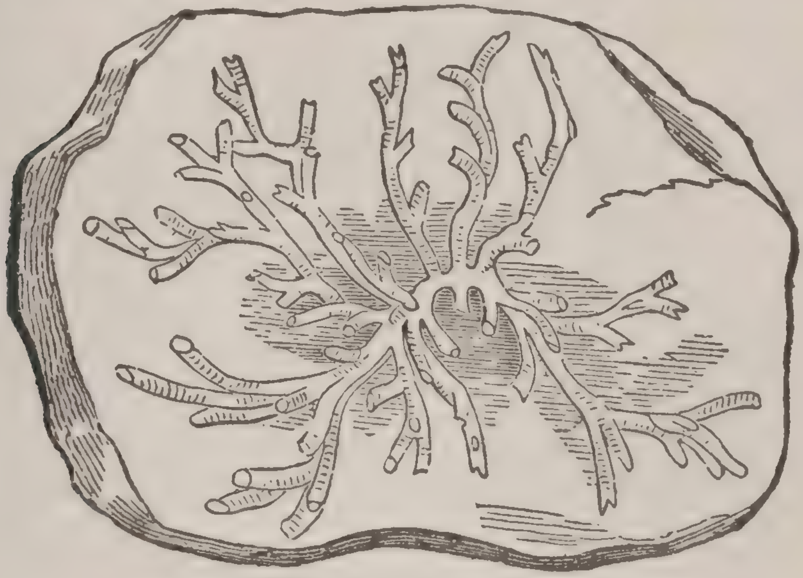
The Cocoa P. or Icaco of the W. Indies is the fruit of *Chrysobalanus icaco*, a tree of nat. order *Rosaceæ*, sub-order *Chrysobalaneæ*. The fruit resembles a P., has a sweet though slightly austere taste, and is eaten both raw and preserved.—The fruit of *Parinarium excelsum*, another of the *Chrysobalaneæ*, is called Gray Plum at Sierra Leone.

PLUM, Date: see Date Plum.

PLUMAGE, n. *plôm'āj* [F *plume*, a feather: L. *pluma*, a small soft feather: W. *pluf*, feathers: Ger. *pflaum*, down]: the feathers that cover a bird: see Birds: Feathers.

PLUMASARY, n. *plô-măs'a-rĭ* [F. *plumasserie*]: plume or collection of ornamental feathers. **Plumas'sier**, n. *-ĭ-ėr*, [F.]: one who prepares or deals in plumes or feathers for ornamental purposes.

PLUMATELLA, *plô-ma-tĕl'a:* genus of moss-animals (*Polyzoa*), having the polyzoarium fixed, membranaceous, and branched; the polypides exserted from the extremities of the branches with a crescent-shaped disk surrounded by a single series of many tentacles. The species are found attached to stones, etc. *P. repens* sometimes spreads over a sq. foot, with branches three inches long, which adhere to some surface throughout almost their whole length. The tentacles are beautifully feathered with cilia on two opposite sides.


Plumatella Repens.
(From Johnston's *British Zoophytes.*)

PLUMB, n. *plŭm* [F. *plomb*—from L. *plumbum*, lead: It. and Sp. *plumbeo*, leaden]: a mass of lead attached to a line, and so hung as to ascertain whether a wall be perpendicular; also called PLUMB-LINE: ADJ. perpendicular; downright: AD. perpendicularly; heavily: V. to adjust to the perpendicular by a plumb-line; to search the depth of by a line with a weight at its end; to sound. PLUMB'ING, imp.: N. the art of working in lead, and using it in buildings, especially in providing and arranging pipes and all other fixtures for supply of water, gas, etc. (see SANITARY ENGINEERING). PLUMBED, pp. *plŭmd.* PLUMBER, n. *plŭm'ėr*, a worker in lead. PLUMB-LINE, a line or cord having a piece of lead at one end, suspended from a frame or narrow board; a line perpendicular to the plane of the horizon. PLUMB-RULE, a simple instrument, same as a *plumb-line,* used by masons, bricklayers, and carpenters. PLUM'BEAN, a. *-bĕ-ăn*, or PLUM'BEOUS, a. *-bĕ-ŭs* [L. *plumbĕŭs*, leaden]: consisting of or resembling lead; leaden; dull; stupid. PLUMB'ERY, n. *-ėr-ĭ*, a place where sheet or mill lead is manufactured into the various articles of a plumber's trade. PLUM'BIC, a. *-bĭk*, pertaining to or containing lead. PLUMBISM, n. *plŭm'bĭzm*, the condition of an individual whose system has been brought under the influence of lead poison, as plumbers and painters. PLUMBIC ACID, the peroxide of lead. PLUMBIFEROUS, a. *plŭm-bĭf'ėr-ŭs* [L. *plumbum*, lead, and *fero*, I produce]: producing or containing lead.

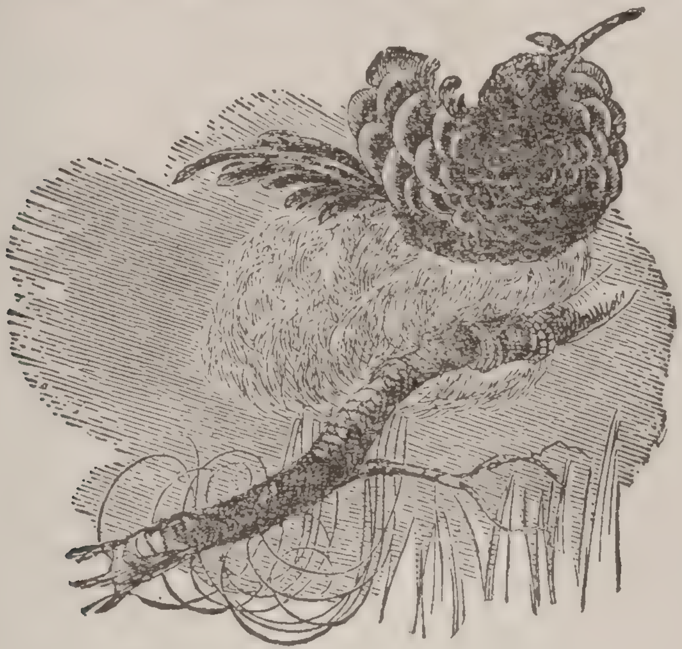
PLUMBAGINEÆ, *plŭm-ba-jĭn'ē-ē,* or PLUMBAGINACEÆ, *plŭm-băj-ĭ-nā'sē-ē:* natural order of exogenous plants, herbaceous or half-shrubby; with leaves somewhat sheathing at the base, and often clustered; flowers in panicles or in heads; calyx tubular, persistent, plaited; corolla very thin, of one or five petals; stamens five; ovary superior, 1-celled, with a solitary ovule; styles generally five; fruit a Utricle (q.v.). There are about 160 known species, found chiefly on the sea-shores and in the salt marshes of temperate regions. Some are found in elevated regions, in all zones. Many have flowers of great beauty, and are favorites in gardens. Some are occasionally used in medicine as tonics and astringents; others, being exceedingly acrid, as vesicants, particularly species of *Plumbago.* Marsh Rosemary (q.v.), otherwise called Sea Lavender, has long clawed petals; a variety of it (*Caroliniana*) grows on the coasts of the northern states, and has a hollow scape and more erect branches. Thrift, or Sea-pink (q.v.), is another example of the order. PLUMBAGIN, or PLUMBAGINE, n. *plŭm-bā'jĭn* [L. *plumbāgo,* the leadwort]: a substance extracted from the roots of the plant leadwort.

PLUMBAGO, n. *plŭm-bā'gō* [L. *plumbāgo,* black lead—from *plumbum,* lead]: one of the names given to *graphite,* or *black lead,* from its resemblance to an ore of lead—used for making pencils, etc.; a form of carbon (see BLACK LEAD). PLUMBAG'INOUS, a. *-băj'ĭ-nŭs,* resembling or containing plumbago, or consisting of it.

PLUMBO-, prefix, *plŭm-bō-* [L. *plumbum,* lead]: connected with, or derived from, lead.

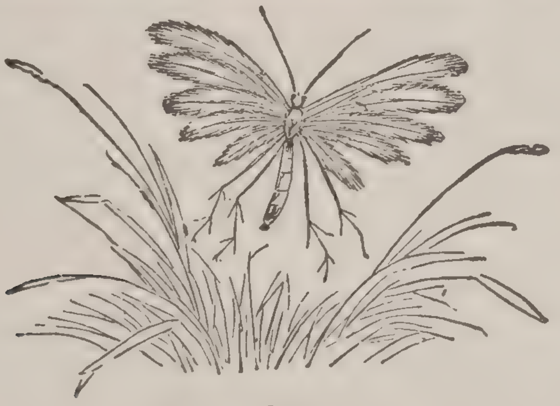
PLUME, n. *plôm* [F. *plume,* a feather—from L. *pluma,* a small soft feather (see also PLUMAGE)]: the feather of a bird, particularly a large one; a bunch of feathers for a decorative purpose; a crest; in *OE.*, a token of honor: V. to pick and adjust feathers; to strip of feathers; to adorn with feathers or plumes; to pride; to boast, as *to plume one's self.* PLUM'ING, imp. PLUMED, pp. *plômd:* ADJ. adjusted or arranged, as feathers; adorned with feathers; stripped of feathers. PLUMY, a. *plôm'ĭ,* feathery; feathered. PLUME'LESS, a. without plumes or feathers. PLUMELET, n. *plôm'lĕt,* a little plume. PLUMIGEROUS, a. *plôm-ĭj'er-ŭs* [L. *gero,* I carry]: feathered; plumed. PLUMIL'IFORM, a. *-ĭl'ĭ-fawrm* [L. *forma,* a shape]: having the shape of a plume or feather. PLUMIPED, a. *plôm'ĭ-pĕd* [L. *pes,* or *pedem,* a foot]: having feathered feet. PLUMOSE' a. *-ōs',* or PLUM'OUS, a. *-ŭs* [L. *plumōsus*]: in *bot.*, applied to hairs or plants that have branches arranged like the beard on a feather; feathery. PLUMOSITY, n. *plôm-ŏs'ĭ-tĭ,* the state of being plumose.

PLUME-BIRD, *plôm'bėrd* (*Epimachus*): genus of birds of family *Upupidæ* (see HOOPOE), but exhibiting points of resemblance both to honey-suckers and to birds-of-paradise. The bill is slender and arched. The plumage is gorgeous, scarcely excelled even by that of birds-of-paradise. The birds are natives of New Guinea and New Holland. They are variously adorned with enormously long tail-feathers, great shoulder-tufts of broad feathers, loose downy plumes, etc. *E. albus* has remarkable thread-like prolongations of the shaft of some of its plumes.



Plume-bird (*Epimachus albus*).

PLUMED MOTH: popular name of a group of '*Nocturnal Lepidoptera*,' known to entomologists as *Fissipennæ* and *Pterophorites;* remarkable for having at least a pair of the wings, and often all the wings, longitudinally cleft into two or more—sometimes six—divisions, beautifully fringed at the edges. The wings are similar to those of other moths in their nervures, but the membrane which usually connects the nervures is interrupted. The Plumed Moths are extremely beautiful, but often pass unobserved in consequence of their small size. Some have the power of folding up the wing like a fan. Although they are ranked among *Nocturnal Lepidoptera*, some of them fly about during the brightest part of the day.



Plumed Moth.

PLUMER, *plŭm'ėr*, William: 1759, June 25—1850, June 22; b. Newburyport, Mass. At the age of 8 years he moved with his parents to Epping, N. H. After an academic education, he was admitted to the bar 1787. He was elected repeatedly to both branches of the state legislature; was a member of the constitutional convention 1792; U. S. senator 1802–07; gov. of N. H. 1812–16 and 1817–8; presidential elector 1820, when he refused to vote for Monroe on account of the latter's financial embarrassments. Thereafter he took no part in public life, though he was a frequent contributor to the periodical press under the signature 'Cincinnatus.' He left valuable biographical and historical writings unpublished.

PLUM'ER, William Swan, d.d., ll.d.: Presbyterian theologian: 1802, July 25—1880, Oct. 22; b. Darlington, Penn. He graduated from Washington Coll., Va., 1825; after studying theol. a year at Princeton, was ordained 1827, and organized a Presb. church in Danville, Va.; and later at Warrenton, N. C.; subsequently had pastorates in other places in the same states, including Petersburg and Richmond, Va. (1st Presb. Chh.); also Baltimore, Md. (Franklin St. Chh. 1847–54); Allegheny, Penn. (where his work was supplemented by that of prof. of theol. in Western Theol. Seminary); in Philadelphia (Arch St. Presb. Chh. 1862–65); and in Pottsville, Penn. In 1866 he became prof. of theol. in the seminary at Columbia, S. C., occupying different depts. of the same till near his death at Baltimore. He founded the paper *Watchman of the South* 1837, and was for many years its editor. He was active in establishing an asylum for the deaf and dumb at Staunton, Va. Dr. P. presided over the Presb. general assembly 1838, and over the southern assembly 1871. His personal appearance and his manner in the pulpit were peculiarly impressive. Among his publications were an *Argument against the Indiscriminate Incorporation of Churches and Religious Societies* (1847); *The Bible True and Infidelity Wicked* (1848); several practical religious books, for children and others; *Rome against the Bible and the Bible against Rome* (1854); *Christ our Theme and Glory* (1855); *The Church and her Enemies* (1856); a work on the Ten Commandments (1864); *Jehovah Jireh* (1866); *Studies in the Book of Psalms* (1866); *The Rock of our Salvation* (1867); *Words of Truth and Love* (1868); commentaries on the Epistles to the Romans and to the Hebrews; and many occasional discourses.

PLUMMER, *plŭm'ėr*, and Plum'mery, *-ėr-ĭ*, less correct spellings of Plumber and Plumbery: see Plumb. Plummer-block, the part of the spring-beam of the paddle-box of a steamship in which the end of the shaft is received.

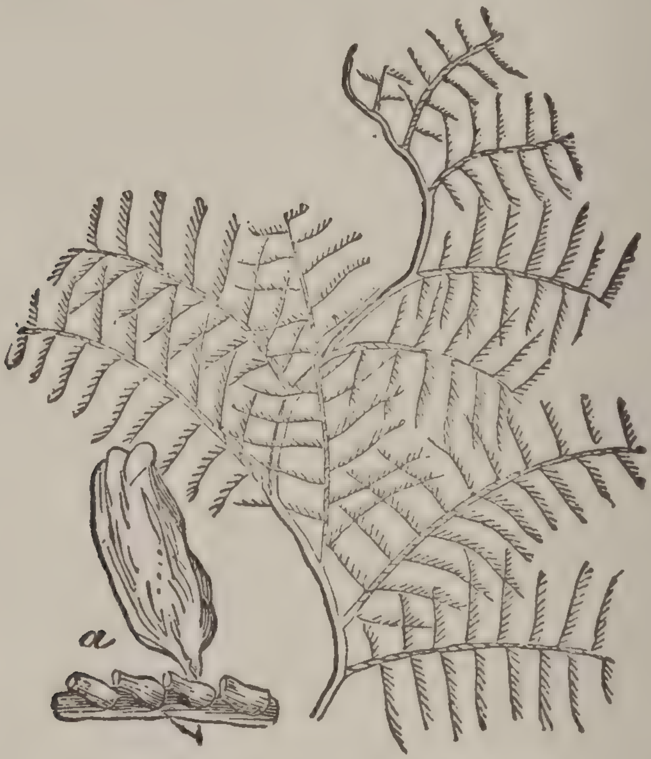
PLUMMET, n. *plŭm′mĕt* [see under Plumb: Sp. *plomada*, a plummet: mid. L. *plumbatum*—from L. *plumbum*, lead]: a long piece of lead attached to a line, used in sounding the depth of water; the line or instrument itself. Plum′ming, n. in *mining*, the operation of searching to find a proper place for an air-shaft. Plummet, or Plummet-line, a piece of lead at the end of a line, generally suspended from a board or frame, used by carpenters and masons to show the vertical line for testing their erections.

PLUMP, a. *plŭmp* [Bav. *plumpf*, the noise made by something falling flat with a dull sound: Sw. *plumpa*, to plump or plunge: Ger. *plump*, massive, plumpish]: full with substance; round and sleek, with fulness of flesh; round; blunt or downright; unqualified, as a lie: V. to make plump; to swell out; to fatten; to dilate; to let fall suddenly and heavily; to fall suddenly or at once, like a mass of dead matter; to give undivided or in a lump, as a vote to *one* only, where a vote to each of *two* or more could be given: Ad. with a sudden fall. Plump′ing, imp. Plumped, pp. *plŭmpt*. Plump′er, n. *-ėr*, that which may swell out something else; a vote given to *one* only when *two* or more candidates are to be elected. Plump′ly, ad. *-lĭ*, fully; without reserve; bluntly. Plump′ness, n. *-nĕs*, fulness of skin; distension to roundness. Plumpy, a. *plŭmp′ĭ*, fat; jolly. To tell a thing plump, to blurt it out without circumlocution.

PLUMPTRE, *plŭm′trĭ*, Edward Hayes, d.d.: 1821, Aug. 6—1891, Feb. 1; b. London: Anglican clergyman and author. He graduated at Oxford Univ. 1844, and became a fellow of Brasenose Coll.; appointed chaplain of King's Coll., London, 1847, and prof. of pastoral theol. there 1853; became prebendary of St. Paul's, London, 1863, and prof. of N. Test. exegesis 1864. He was appointed rector of Pluckley, Kent, 1869; and vicar of Bickley 1873. He was a member of the O. Test. commission for revising the authorized version of the Bible. He became dean of Wells 1881. He has written many books and contributed largely to periodical literature. He is author of translations of *Sophocles*, *Æschylus*, and Dante's *Divina Commedia; Respice, Aspice, Prospice* (an essay on the law of progress in theology); *Christ and Christendom; Lazarus, and Other Poems; St. Paul in Asia Minor;* commentaries on several books of the Bible, etc.

PLUM-PUDDING: see under Plum.

PLUMULARIA, *plô-mū-lā′rĭ-a:* genus of hydroid polyps, type of the family *Plumulariidæ;* plant-like, rooted, simple, or branched; with feathery shoots and offsets; and having hydra-like polyps in small cells arranged on one side of the shoot or branch, usually in the axil of a horny spine. The species are numerous, inhabitants of the sea, attached to stones, shells, sea-weeds, etc. They are very beautiful objects, even as seen by the naked eye, still more when examined by the microscope; combining delicacy with elegance. The polyps in a single P. are often exceedingly numerous; those of *P. falcata*, often found at low-water mark, have been calculated as 80,000 or 100,000 in number.



Plumularia Falcata (natural size):
a, the ovarian vesicle and four of the polyp-cells of P. falcata, magnified. (From Johnston's *British Zoophytes.*)

PLUMULE, n. *plô′mūl*, or PLU′MULA, n. *-mū-lă* [L. *plum′ula*, a little feather—from *pluma*, a feather]: in *bot.*, that point of the embryo of a seed which develops in a direction contrary to the radicle, being the first bud or gemmule of the young plant: see SEED.

PLUMY: see under PLUME.

PLUNDER, n. *plŭn′dėr* [Low Ger. *plunden*, rags: Ger. *plunder*, things of little value; *plündern*, to pillage: Dut. *plunderen*, to seize on the goods of another by force]: spoils of war; booty; the produce of robbery or fraud: V. to take by open force, as the goods of an enemy; to spoil; to pillage; to rob. PLUN′DERING, imp. PLUN′DERED, pp. *-dėrd.* PLUN′DERER, n. *-dėr-ėr*, one who plunders; a robber. PLUN′DERAGE, n. *-āj*, the embezzlement of goods on board a ship.—SYN. of ‘plunder, v.’: to spoil; sack; rifle spoliate; pillage: despoil; rob; strip.

PLUNGE, v. *plŭnj* [F. *plonger;* Dut. *plotsen*, or *plonzen*, to fall into the water: Swiss, *bluntschen*, the sound of a thick heavy body falling into the water]: to thrust into water or other fluid substance; to thrust into any substance that is penetrable; to pitch or throw one's self headlong into water; to dive; to fall or rush into any distress, or into any state or circumstances in which the person is surrounded or inclosed, as into sorrow, difficulty, darkness; among *quadrupeds*, to throw the body forward and the hind legs up, as a horse: N. the act of thrusting or pitching into water; the act of throwing one's self headlong, as an unruly horse. PLUNG′ING, imp.: ADJ. diving; rushing headlong: N. the act of rushing or putting into water, etc.; the attempt of an unruly horse to throw his rider. PLUNGED, pp. *plŭnjd.* PLUNG'ER, n. *-ėr,* one who plunges; a solid brass cylinder used as a forcer in a forcing-pump. PLUNGEON, n. *plŭn'jŏn,* a sea-fowl; the diver. PLUNGE BATH, a large bath in which persons can put themselves wholly under water. PLUNGE-POLE, the pump-rod of a pumping-engine. PLUNGING FIRE, in *mil.*, the fire of guns directed downward from a height. *Note.*—Brachet says F. *plonger* is from mid. L. *plumbĭcārĕ*, to fall like lead —from *plumbum*, lead: comp. prov. F. *plonquer*, to dive, due to the same mid. L. form.

PLUPERFECT, a. *plô'pėr-fĕkt* [L. *plus,* more; *perfectus*, perfect, complete]: in *gram.*, the tense of a verb with the sign *had*, signifying that a certain action or event occurred before some other action or event, as 'I had loved.'

PLURAL, a. n. *plô'răl* [L. *plurālĭs,* plural—from *plus*, more: It. *plurale;* F. *pluriel;* OF. *plurel*, plural]: consisting of more than one; expressing two or more. PLU'RALLY, ad. *-lĭ.* PLURALITY, n. *plô-răl'ĭ-tĭ*, state of being or having a greater number; a number consisting of more than one of the same kind; a majority over others, as of votes; more than one benefice held by the same clergyman. PLURALIST, n. *plô'răl-ĭst*, a clergyman who holds more than one benefice. PLU'RALIZE, v. *-īz.* PLU'RALIZING, imp. PLU'RALIZED, pp. *-īzd.* PLU'RALISM, n. *-ĭzm,* in *canon law*, possession by the same person of two or more ecclesiastical offices, whether of dignity or of emolument. P. has been held unlawful from the earliest times, from the impossibility, in ordinary cases, of the same individual adequately discharging the duties of more than one office. In cases in which this impossibility does not really exist, the benefices or dignities are considered 'compatible,' and may be held by the same person, with the due dispensation, in the Church of Rome by the pope, in the Anglican Church by the crown, or in recent times by the abp. or the privy council.

PLURI, *plô'rĭ* [L. *plus*, more, *plūris*, of more]: the first element of a compound, signifying 'several.'

PLURIES, n. *plô'rĭ-ēz:* in *law*, a writ which issues in the third instance, after the first and the alias have been ineffectual; so called from the wood *pluries* (often), which occurs in the first clause.

PLURILITERAL, a. *plô'rĭ-lĭt'ėr-ăl* [L. *plus*, more, *plūris,* of more; *lĭtĕra,* a letter]: containing more than three letters.

PLURILOCULAR, a. *plô'rĭ-lŏk'ū-lėr* [L. *plus*, or *plūrem,* more; *loculus*, a little place—from *locus*, a place]: in *bot.*, having several divisions containing seeds, as the lemon and the orange.

PLURIPARTITE, a. *plô'rĭ-pâr'tīt* [L. *plus,* or *plūrem,* more; *partītus,* parted or divided—from *pars*, a part]: in *bot.*, applied to an organ which is deeply divided into several nearly distinct portions.

PLUS, ad. *plŭs* [L. *plus*, more]: more: N. in *alg.*, or *arith.*, the sign (+) set between numbers or quantities, signifying that they are to be added together.

PLUSH, n. *plŭsh* [F. *peluche*—from It. *peluccio*, plush; *peluzzo*, fine hair—from L. *pilus*, hair: Piedm. *plucia;* Ger. *plüsch;* Dut. *pluis*, a lock or tuft of hair, plush]: woven cloth, having a long shaggy pile on the upper surface. Although woven like velvet, it differs from it in the greater length of the pile, and in its not being clipped or shorn to a uniform length. Formerly, it was made of a double warp, one thread being usually double worsted yarn, the other, intended to form the pile, of goat's hair, and the weft of worsted; occasionally, only worsted was used. Now, it is made extensively of silk and cotton, the silk taking the place of the goat's hair to form the pile. This silk plush is the material now almost universal for gentlemen's hats, instead of beaver-hair as formerly: it is worked also in colored silks, for many articles of ladies' attire: see WEAVING.

PLUTARCH, *plū'târk* (*Ploutarchos*): biographer and moralist: born at Chæroneia in Bœotia. He was contemporary of the Plinys and Tacitus, but we can only approximate to the year of his birth. He tells us that he was a student of philosophy at Delphi, under Ammonius, when Nero was making his progress through Greece A.D. 66; and we may infer that in that year he was beyond the age of puberty. He lived some years in Rome, and in other towns of Italy, where he seems to have been much occupied with public business, and with giving lessons in philosophy—to which he attributes his having failed to learn the Latin language in Italy, and his having to postpone his studies in Roman literature till late in life. During the reign of Domitian, he was delivering lectures on philosophy at Rome; but we have not sufficient evidence for the statement that he was preceptor to Trajan, or that that emperor raised him to consular rank. The later years of his life he spent at Chæroneia, where he discharged the duties of archon and priest of Apollo. He lived till 106, eighth year of the reign of Trajan; but how much longer is not known, though there is some probability that he outlived Trajan, who d. 117. He was married to an amiable wife, Timoxena, by whom he had several sons, who reached manhood, and left descendants.

The work by which P. is best known is his *Parallel Lives* of 46 Greeks and Romans. These are arranged in pairs, each pair forming one book (*biblion*), consisting of the life of a Greek and a Roman, and followed by a comparison between the two men: in a few cases, the comparison is omitted or lost. The heroes of these biographies are the following: 1. Theseus and Romulus; 2. Lycurgus and Numa; 3. Solon and Valerius Publicola; 4. Themistocles and Camillus; 5. Pericles and Q. Fabius Maximus; 6. Alcibiades and Coriolanus; 7. Timoleon and Æmilius Paulus; 8. Pelopidas and Marcellus; 9. Aristides and Cato the Elder; 10, Philopœmen and Flamininus; 11. Pyrrhus and Marius; 12. Lysander and Sulla; 13. Cimon and Lu-

PLUTARCH.

A. D. 50-120.

FATHER OF BIOGRAPHY.

cullus; 14. Nicias and Crassus; 15. Eumenes and Sertorius; 16. Agesilaus and Pompeius; 17. Alexander and Cæsar; 18. Phocion and Cato the Younger; 19. Agis and Cleomenes, and Tiberius and Caius Gracchus; 20. Demosthenes and Cicero; 21. Demetrius Poliorcetes and M. Antonius; 22. Dion and M. Junius Brutus. In addition, are placed in the editions after the 46th *Parallel Lives*, the biographies of Artaxerxes Mnemon, Aratus, Galba, and Otho. P. has no equal in ancient, and few in modern times, as a writer of 'Lives.' His power lies in his felicitous grasp of the character as a whole, and his skill in keeping minor details in subordination. It is not till the reader has seen the portrait in its completeness that his attention is attracted to accessory points. 'There are biographers (says an admirable writer in the *Quarterly Review*) who deal with the hero, and biographers who deal with the man. But Plutarch is the representative of ideal biography, for he delineates both in one.' Yet with all their artistic harmony, his lives abound with anecdotes and *bon-mots* in such profusion, that they form one of our chief authorities for the table-talk of the Greeks and Romans. Their popularity in ancient, mediæval, and modern times, with readers of every rank and age, is extraordinary; and they have exerted a very powerful and salutary influence on the art of biography. The other writings of P., more than 60 in number, are included under the general title *Moralia*, or Ethical Works. Several ofthese are not purely ethical in their tenor; while many of them are probably not by him, or if they are, do him small credit. Even in the best of the *Moralia* there is no philosophical system; their merits are not speculative, but practical; and their value consists mainly in their good sense, in the justness of their views on the ordinary affairs of human life; and in the benevolence of tone diffused throughout them. The best text of the Lives is that of Immanuel Bekker; the best translation in English is that of Dryden and others, as re-edited by Clough. The best ed. of the *Moralia* is by Wyttenbach (Oxford 1795–1800); and of the entire works, the editions of Reiske (Leip. 1774–82) and Hutten (Tüb. 1791–1805).

PLUTEUS, n. *plô'tě-ŭs* [L. *plutěŭs*, a breastwork or parapet on towers, etc.—perhaps from *pluit*, it rains—*lit.*, something that protects against rain]: in *anc. arch.*, wall sometimes built to close the intervals between the columns of a building; also the space between two orders placed one over the other as in the amphitheatres, etc. In *milit.*, P. was a movable gallery shaped like an arched wagon, used by besiegers for protection of their archers. In *zool.*, the larval form of the Echinoidea.

PLUTO, n. *plô'tō* [L. *Pluto:* Gr. *Ploutōn*]: in the *anc. myth.* of the Greeks and Latins, the god of the lower world, husband of Proserpine, and brother of Jupiter and Neptune. PLUTONIAN, a. *plô-tō'nĭ-ăn*, of or relating to Pluto, or to the regions of fire; dark. PLU'TONIST, n. *-tŏn-ĭst*, one who refers the formation of rocks and the earth's crust to the action of fire. PLU'TONISM, n. *-ĭzm*, the doctrine or theory which refers the rock-formation of the earth's crust to the action of fire, rather than water; opposite of *Neptunism*. PLUTONIC, a. *plô-tŏn'ĭk,* in *geol.*, applied to igneous rocks found at some depth in the earth, as distinct from *volcanic,* which are consolidated on the surface—the plutonic being more crystalline and exhibiting more structure than the volcanic, as in granites. *Plutonic rocks* was the name given by Lyell to the Granitic Rocks, on the supposition that they were formed at considerable depth in the earth, and were cooled and crystallized slowly under great pressure. They were so designated in distinction from the Volcanic Rocks, which, though they have risen up from below, cooled from a melted state more rapidly upon or near the surface, as it was supposed. It is now proven, however, that the granites, while sometimes forced up into fissures in a plastic state, are in general sedimentary rocks that have been metamorphosed *in loco* by two conditions, moisture and some degree of heat, not necessarily great if slowly acting through a long period. See GRANITE.

PLU'TO [Gr. *Ploutōn,* from *plouteō,* I am rich]: originally only a surname of HADES, as the giver or possessor of riches: in the mythology of Greece, the third son of Kronos and Rhea, and brother of Zeus and Poseidon. On the tripartite division of the universe, he obtained the sovereignty of the under-world—the realm of darkness and ghostly shades, where he sits enthroned as a 'subterranean Zeus'—to use the expression of Homer, and rules the spirits of the dead. His dwelling-place, however, is not far from the surface of the earth. P. is inexorable in disposition, not to be moved by either prayers or flatteries. He is borne on a car, drawn by four black steeds, which he guides with golden reins. His helmet makes him invisible, whence, according to some scholars, his name of *Hades* [from *a,* priv., and *idein,* to see]; though others, with at least equal probability, derive Hades from *hadō,* or *chadō,* I receive or embrace, and translate the word the 'all-receiver.' In Homer, Hades never means a place, but always a person. Moreover, it is to be noticed that the poet does not divide the realm of the shades into two separate regions. All the souls of the dead—good and bad alike—mingle together. Subsequently, however, when the ethical conception of future retribution became more widely developed, the kingdom of the dead was divided into Elysium (q.v.), the abode of the good, and Tartarus (q.v.), the place of the wicked. This change also exercised an important influence on the conception of Pluto. The ruler of the under-world not only acquired additional power and majesty, but the very idea of his character was essentially modified. He came to be regarded as a beneficent deity, who held the keys of the earth in his hand, and possessed its metallic treasures (whence his new name *Pluto*, or *Plutus*), and who blessed the year with fruits; for out of the darkness underground come all the riches and swelling fulness of the soil. Hence, in later times, mortals prayed to him before proceeding to dig for the wealth hidden in the bowels of the earth.

P. married Persephone (Proserpina), daughter of Demeter (Ceres), after carrying her off from the plains of Enna. He assisted his brothers—according to the mythological story—in their war against the Titans, and received from the Cyclops, as a reward for delivering them from Tartarus, the helmet that makes him invisible, which he lent to Hermes (Mercury) in the aforesaid war, to Perseus in his combat with the Gorgons, and which ultimately came to Meriones. The Erinnyes and Charon obey his behests. He sits in judgment on every open and secret act, and is assisted by three subordinate judges, Æacus, Minos, and Rhadamanthus. The worship of P. was widely spread among both the Greeks and the Romans. Temples were erected to his honor at Athens, Elis, and Olympia. Among trees and flowers, the cypress, boxwood, narcissus, and maidenhair were sacred to him; bulls and goats were sacrificed to him amid the shadows of night, and his priests had their brows garlanded with cypress-wreaths. In works of art, he resembles his brothers Zeus and Poseidon; only his hair hangs down somewhat wildly and fiercely over his brow, and his appearance, though majestic, as becomes so mighty a god, has something gloomy and terrible. There can be little doubt that he, as well as Pan (q.v.), helped to trick out the conception of the devil prevalent during the middle ages, and not yet extinct. If it was from Pan that the devil derived those physical characteristics alluded to in the famous *Address to the Deil* by the poet Burns:

> 'O thou, whatever title suit thee,
> Auld *Hornie*, Satan, Nick, or *Clootie*,'

it may be also that to P. he owes his position as 'king of Hell,' 'his Blackness,' and many of the insignia of his infernal royalty.

PLUTOCRACY, n. *plô-tŏk'ra-sĭ* [Gr. *ploutos*, riches; *kratia*, rule]: govt. by the rich; a class powerful in the state because of its wealth. PLUTOCRAT, n. *plô'tō-krăt*, one having power in the state because of his wealth. PLU'TOCRAT'IC, a. having the character of a plutocrat, or a plutocracy.

PLUTUS, n. *plô'tŭs* [L. *Plutus;* Gr. *Ploutos*, the god of riches]: in *anc. myth.*, the god of wealth; thence figuratively riches; wealth. P was fabled to be son of Ceres and Iasius: he was represented as blind, and as bestowing his gift on the good and the bad indiscriminately. The caves of Spain, famous for their deposits of precious metals, were assigned as his abode.

PLUVIAL, a. *plô'vĭ-ăl*, or PLU'VIOUS, a. *-ŭs* [F. *pluvial;* L. *pluvĭālis*, of or belonging to rain; *pluvius*, rainy—from *pluvĭă*, rain: It. *pluviale*, *piovoso*]: of or belonging to rain; rainy; in *geol.*, applied to operations and results that arise from or depend on the action of rain.

PLUVIAMETER, n. *plô'vĭ-ăm'ĕ-tėr* [L. *pluvĭa*, rain; Gr. *metron*, a measure]: an instrument for receiving and measuring the amount of rain that falls in any locality; a rain-gauge. PLU'VIAMET'RICAL, a. *-ă-mĕt'rĭ-kăl*, pertaining to a rain-gauge. PLU'VIAMET'RICALLY, ad. *-lĭ*. PLU'VIAM'ETRY, n. *-ăm'ĕ-trĭ*, the art of measuring the rainfall. The preceding are also spelt with *o* before *m*, as *pluviometer*.

PLUVIOMETER, PLUVIOMETRICAL, etc.: see PLUVIAMETER.

PLUVIOSE, n. *plô′vĭ-ōs* [F. rainy—from L. *pluviosus*—from *pluvia*, rain]: second winter month in the French republican year: see CALENDAR.

PLY, v. *plī* [F. *plier*, to fold or bend: Ger. *flechten*, to twist: Sp. *plegar*, to plait: L. *plicārĕ*, to fold: Gr. *plekō*, I twist]: to give one's mind to; to lay on with force; to apply closely and steadily to; to work at; to work; to offer service; to solicit earnestly; to practice or perform with diligence; to run regularly between two ports, as a vessel—also said of cabs running for hire: N. a fold; a plait. PLY′ING, imp.: N. urgent solicitation; effort or endeavor to make way against the wind. PLIED, pp. *plīd* PLIER, n. *plī′ėr*, one who plies. PLY′ERS, n. plu. *-ėrz*, in *mech.*, a kind of balance used in raising or letting down a drawbridge—another spelling of PLIERS. TO PLY A TRADE, to exercise or follow a trade. TO PLY ONE'S HEELS, to exercise one's heels in running away. TO PLY ONE WITH FLATTERY, to keep flattering him.

PLYMOUTH, *plĭm′ŭth:* town, cap. of P. co., s.e. Mass., port of fishery and commerce on a broad but shallow harbor, w. of Cape Cod Bay, with shelter formed by the P. and Duxbury beaches; 37 m. s.e. of Boston, 28 m. n.e. of New Bedford, 48 m. n. e. of Newport, R. I., 30 m. n.e, of Fall River, Mass. It was till 1691, Sep., the seat of a colonial State of P., larger than Rhode Island, founded 1620, Dec. 21, by the famous Pilgrim Fathers (q.v.). The town has a front of about 5 m. from n. to s. on the harbor. The ground built over is mostly elevated, presenting many choice residential sites, which have been improved to make a place of notable attraction for summer visitors. The area of P. extends back about 5 m., and n. to s. about 18 m., with a width s. of the harbor of 8 or 9 m. Chiltonville and S. P. are small centres of population and business s.w. of the harbor; and at Manomet and vicinity are hotels and residences for summer resort. Throughout the larger part of P., great numbers of ponds with very fine water and excellent fishing are found. The industries of P. are varied and substantial, including very large cordage works, woolen and cotton mills, iron works, foundry, large manufactories of rivets, tacks, wire nails and brads, patent joints for bedsteads, zinc and iron plate, cotton duck, etc., and shoe factories. The former large cod fisheries of P. have declined, but mackerel fishing is still carried on. Cranberry culture is extensive. In the woods is plentiful growth of the beautiful Mayflower. One of the lines of the Old Colony r. r. extends 37 m. from Boston to P., with one route direct, and a second following the coast by Hingham, Cohasset, Marshfield, and Duxbury. New r. r. lines are under way, one s. to the cape, and one w. to Middleboro, giving direct connection with New York. In summer steamers ply daily between Boston and P. A massive granite monument, designed 1853 (corner-stone laid 1859, pedestal 45 ft. high, completed 1877, with four figures of heroic size on the buttresses of the pedestal, Law, Freedom, Education, and Morality, and a colossal statue of Faith, 36 feet high), was dedicated, 1890, Aug. 1, with poem by a Rom. Cath. journalist, John Boyle O'Reilly, and oration by W. C. P. Breckenridge of Ky. Its site is considerably n. of any historical spot, with a view to better display. Pilgrim Hall, built 1824, and thoroughly renovated recently, is an interesting museum of Pilgrim relics, portraits, memorial paintings, and other art, visited (1890) by 16,000 persons who paid fee, and 8,000 grand army excursionists admitted free. The court-house preserves the original colony records. The famous Rock, a bowlder of syenitic granite, from which the water-edge of the harbor has receded considerably, has been inclosed (1867) under a canopy of granite, and the face of Coles hill adjoining it, where the forty martyrs of the first winter were buried, is kept as a memorial spot under charge of the Pilgrim Hall Soc. The burial hill, a little distance back from the shore, marked originally the rear of the settlement, where the square log meeting-house, which, with a flat ordnance platform for a roof, served also as a fort. The schools, high schools, and private schools of P. are of the best type; there is an excellent weekly paper; the churches of various denominations are well supported; and the people are notable for thrift, character, and culture. The post-office had receipts (1890) more than $11,000; custom-house more than $100,000. There are water supply, electric lighting, and an electric street railway. Pop. (1880) 7,094; (1890) 7,314; (1900) 9,592.

PLYM'OUTH: borough in Plymouth twp., Luzerne co., Penn., in the Wyoming valley, on the e. bank of the Susquehanna river, and on the Lackawanna and Bloomsburg railroad. It is 20 m. s.w. of Scranton, and 4 m. below Wilkesbarre. It has a high school and an academy, several newspaper offices, churches, national and savings banks. The inhabitants are principally Irish, Welsh, and Germans, employed in the extensive coal-mines near. In 1885 P. was visited by a scourge of typhoid fever, which in most cases proved fatal: it was occasioned by pollution of the drinking-water. Pop. (1870) 2,684; (1880) 6,085; (1890) 9,344; (1900) 13,649.

PLYM'OUTH: English seaport and market-town, and parliamentary and municipal borough in s.w. Devonshire, 246 m. w.s.w. of London. It stands in the bight of Plymouth Sound (q.v.), between the estuaries of the Plym and Tamar. W. of it is Stonehouse (q.v.), a township and coast-guard station; still further w. is Devonport (q.v.), the great naval and military station. The two former places, however, having become united by continuous lines of houses, have lost their individuality, and are (with Devonport, which is walled, fortified, and surrounded by a moat) now generally considered as one great town. Of this great centre of fashion, trade, and naval and military preparation, P. proper, which covers an area of one sq. m., may be called 'the city,' and Devonport the 'west-end;' while Stonehouse is an intermediate district, containing chiefly factories, barracks, victualling yards, hospitals, and other institutions. P. proper extends from Mill Bay on the w. to the mouth of the Plym on the east. Its site is somewhat rugged and uneven; an eminence forming the suburbs runs along its n. side, and another eminence, partly occupied by the citadel, fronts the Sound. The chief buildings are the Royal Hotel, comprising an immense inn, assembly-rooms, a theatre, and the Athenæum; public library, containing in its Cottonian collection 300 sketches by the old Italian masters; Guildhall; St. Andrew's Church, whose tower dates from 1490 (restored in 1874–5); and Charles Church (1646–58), dedicated to 'St. Charles the Martyr.' There are also important educational establishments, some of which are endowed, and many charitable institutions. Mill Bay and Sutton Pool are two small inlets of the sound, in which lie all the merchant-vessels bound for P. proper. Between these inlets, and along the shore, is the eminence or high plateau, called the Hoe. From this ridge, whence first the approach of the Spanish Armada is said to have been descried, magnificent shore and sea views are obtained. Its e. end is occupied by the citadel, a fortress mounting 150 guns, which commands the entrance of the Cutwater (the lower estuary of the Plym), and of Sutton Pool. Mill Bay, on the w., is so deep that vessels of 3,000 tons can lie at the pier at low-water. Here are the important Great Western Docks, covering 14 acres, with depth of 22 ft. Near these docks, and connected with them by a tram-line, are the railway termini. In 1880 there entered the port 3,665 vessels, of 726,937 tons; cleared 2,943, of 639,455 tons. The commerce is considerable with the Cape of Good Hope, the W. Indies, and the Mediterranean; the coasting trade also is important, and the fisheries are productive. Pop. (1881) 77,401; (1891) 84,179; (1901) 107,509.

P., described by Leland as being, in the reign of Henry II., 'a mene thing, an inhabitation of fishars,' was called by the Saxons Tameorworth (town on the Tamar); after the Conquest it was called Sutton (South Town); and it was not till the reign of Henry VI. that it received the name of Plymouth (mouth of the Plym). During the 14th and 15th c. it was frequently attacked and set on fire by the French, and 1512 an act was passed for the strengthening of its defenses, which since then have greatly increased, until now all the shores of the Sound are well defended by cannon, and a cordon of inland forts has been constructed at immense cost, surrounding the Three Towns at a distance of two to three miles.

PLYMOUTH BRETHREN, or **Plymouthites**: religious sect, styling themselves simply Brethren, which sprang into existence about 1830–35 in Plymouth, Dublin, and other places in the British islands, and which has extended itself considerably in the British dominions and in parts of the continent of Europe, particularly among the Protestants of France, Switzerland, and Italy, and somewhat in the United States. **Plymouthism**, n. *-ĭsm*, the tenets of the P. B.—The *Plymouth Brethren* seem to have originated in a reaction against exclusive high church principles as maintained in the Church of England, with everything of a kindred nature in other churches, and against a dead formalism associated with 'unevangelical' doctrine. Many of the first members of the new religious communities formed in Plymouth and elsewhere were retired Anglo-Indian officers, men of unquestionable zeal and piety; and these communities began to appear almost simultaneously in a number of places. Their origin is, however, to be ascribed largely to the labors and influence of Mr. Darby, from whom the P. B. on the continent of Europe are generally called *Darbyites*. Mr. Darby was a barrister, moving in the highest circles of society; and under deeply religious impressions, became a clergyman of the Church of England, and lived for some time in a mud-hovel in the county Wicklow, Ireland, devoting himself to his work; but afterward left the Church of England from conscientious scruples, and became an evangelist unconnected with any church. In this character he labored both in England and on the continent of Europe preaching in French, English, and German. He also gave utterance to his opinions in numerous pamphlets, and in a quarterly periodical called *The Christian Witness*, which was the 'organ' of the Plymouth Brethren. He continued for many years to visit the communities or meetings of Plymouth Brethren. His tenets, and those of the P. B. in general, are strictly Calvinistic: original sin and predestination, the efficacy of Christ's sacrifice, the merit of his obedience, the power of his intercession, the gracious operations of the Holy Spirit in regeneration and sanctification, are prominent points. Millenarian views also are generally entertained by the P. B.; and they usually practice the baptism of adult believers without regard to previous infant baptism. They acknowledge the sacrament of the Lord's Supper, and administer it to one another in their meetings, usually on every Sunday, or 'first day of the week;' in this as in everything else, refusing to acknowledge any special ministers. They utterly reject the rite of confirmation. Their most distinctive peculiarity, in contrast with other Calvinistic churches, is their complete rejection of ecclesiastical organization. They suppose the whole Christian body in the world to have declined from the simplicity of truth and duty, like Israel of old, and therefore to have been 'corporately rejected of God.' and believe the true church to consist of themselves and of other chosen ones in the various Christian churches. They refuse to recognize any form of church government, or any office of the ministry; they insist much on the equal right of every *male* member of the church to 'prophesy' or preach; and in their meetings, after each hymn or prayer, there is usually a pause, that any one, moved by the Spirit, may undertake this office. They exclude persons known to have been guilty of gross sins from participation with them in the Lord's Supper, until proof is afforded of repentance. The P. B. reject every distinctive appellation but that of Christians; though a special denomination is found necessary to designate them; and, in fact, no one not holding their views could remain associated with them. A great schism took place among them in consequence of doctrines preached at Plymouth and Bristol concerning the human nature of Christ, Mr. Darby vigorously opposing what he deemed a dangerous error, and he and his adherents utterly separating from the fellowship of those who maintained or even refused to condemn it. One of the most noted (if not notable) converts to the principles of the sect was the revivalist Guinness, who was baptized **1860** by another Plymouth brother, Lord Congleton.

On the continent of Europe the P. B. have in many places given great trouble to the Prot. churches by their opposition to all ecclesiastical order or organization. See works by Mrs. Grattan Guinness (1861) and Dennett; and hostile criticisms by Carson (1870), Reid (1874), and Croskery (1879).

In the United States the P. B. have 314 assemblies or organizations, and 6,661 members.

PLYM'OUTH-CLOAK: in *slang,* a cudgel.

PLYMOUTH SOUND: well-known roadstead off the s.-w. coast of Devonshire; important as a naval station, and with considerable claims to be called, as it frequently has been, the most beautiful estuary on the English coast. Its position at the entrance of the English Channel is much in its favor. It is two and a half m. wide, and extends inland three m., penetrating into the country by means of the harbors of Hamoaze and Catwater, the estuaries of the Tamar and Plym respectively. On its w. side is Cawsand Bay. The shores, which present many beautiful views, rise in hills 100 to 400 ft., and are dotted with woods and with villages, and bound by coasts mostly rocky and abrupt. Mount Edgecombe Park, the beautiful seat of the Earl of Mount Edgecombe, occupies the w. shore. At the mouth of the Tamar is the small island of St. Nicholas, or Drake's Island, a pyramidal rock strongly fortified. The Sound is open to the s.w., from which direction strong winds frequently blow, and violent surges are thrown in from the Atlantic. A massive stone breakwater, 1,700 yards in length, costing about £1,500,000, was completed 1841: see BREAKWATER. On a sunken rock just inside the breakwater and at its centre, a strong stone fort has been erected; and an extensive series of stone batteries has been built at Bovisand and Picklecombe on the mainland, on either side of the entrance to the harbor. 14 m. s.s.w. of Plymouth is Eddystone Light-house: see EDDYSTONE.

PNEUMA-, prefix, *nū-ma-* [Gr. *pneuma, pneumatos,* wind. air; *pneō,* I breathe]: pertaining to or connected with the air, gases, or breath.

PNEUMAGRAM, *nū'mă-grăm,* n. [Gr. *pneuma,* air, spirit; *gramma,* a writing, letter, document]: written message sent by pneumatic dispatch-tube—a term applicable especially when the very paper on which the sender has written his message is forwarded by tube instead of having its contents transmitted by telegraph.

PNEUMATIC, a. *nū-măt'ĭk*, or PNEUMAT'ICAL, a. *-ĭ-kăl* [Gr. *pneumatikos*, pertaining to breath, spiritual; *pneuma*, wind, air—from *pneō*, I breathe: F. *pneumatique*]: of or relating to air, to breath, or to a gas; moved or played by means of air or wind; pertaining to pneumatics. PNEUMAT'ICALLY, ad. *-lĭ*. PNEUMAT'ICS, n. *-ĭks*. science which treats of the mechanical properties of air, and aëriform fluids, e.g., their weight, pressure, elasticity, motion, etc. The great representative of the aëriform fluids is the atmosphere. The atmosphere is frequently called 'air,' to distinguish it from the others known as 'gases.' The fact of air having weight and generally exercising pressure and resistance, was unsuspected by most of the ancients, though they were aware of the resistance in particular cases, from seeing and feeling the effects of the wind; but the idea that air in a state of rest exerts pressure on a body immersed in it, seems never to have occurred to them. Aristotle, however, asserted that air had weight, and so did several subsequent philosophers; but the truth of this was established first by Torricelli (q v.), who also found the amount of this weight or pressure. See ATMOSPHERE. Pascal (q.v.) completed the investigation, and invented the Barometer (q.v.). The experiments of these philosophers proved that what is called 'suction' is nothing more than an effect of the pressure of the air on one side of a body, unbalanced by an equal pressure of air on the opposite side of it. To this property of air are due the working of the various kinds of Pumps (q.v.), the Barometer (q.v.), the siphon, cupping-glass, etc. But the great distinguishing feature of aëriform substances is the repulsive force of their molecules toward each other, and the consequent expansion of these substances when pressure is removed, or compression when pressure is increased. The expansibility and compressibility of air was investigated by means of the Air-pump (q.v.), an invention of Guericke (q.v.), and soon resulted in the discovery of a law by Boyle (about 1650), and Mariotte (1676), called *Mariotte's Law* (q.v.), which affirms that 'at a given temperature the volume of a gas is inversely as the pressure.' See GASES. The second great law of tension and pressure is that of Dalton and Gay-Lussac (1801), which states that 'when the tension remains the same, the density of a gas varies inversely as the temperature'—i.e., when the temperature is increased by equal increments, the bulk is increased by equal increments. The motion of gases is subject to the same laws with that of liquids, since those laws depend for their efficacy not on the liquidity, but on the fluidity (see FLUID) of these substances. The flow of gases in tubes seems retarded by friction against the sides, in the same way as that of water is, and the diminished efflux at an orifice shows that the *vena contracta* exists for gases as well as for liquids. For examples and further explanations of the properties of air, see ATMOSPHERE: BALLOON: BAROMETER: DIVING-BELL: MAGDEBURG HEMISPHERES: ETC.

PNEUMATIC DISPATCH': mode of sending parcels, mail-bags, or telegram papers through a tube by atmospheric pressure, or by a partial vacuum. Early in the 19th c. Mr. Medhurst in England proposed air-tight tunnels, with carriages moving through them on rails, and propelled by compressed air from behind, or by suction through a vacuum formed in front. See ATMOSPHERIC RAILWAY.

In 1861 was announced in London a *Pneumatic Dispatch* project for parcels and mail-bags, based on a reconsideration of causes of failure in earlier schemes. An experimental quarter-mile of iron tube about 30 inches in diameter was laid down in Battersea, through which it was found easy to propel a train of two iron carriages of 7 cwt. each, at a rate of 30 m. an hour. A *Pneumatic Dispatch Company* began operations in London 1863. Later, a tube nearly 4½ ft. diameter, 2¾ m. long, was laid down at as small a depth beneath the carriage-way of the several streets as the water and gas pipes would permit. It is chiefly of cast-iron; but some portions on a sharp curve are of brick. A large engine near Lincoln's Inn Fields, actuating a peculiar revolving fan of great dimensions, supplies the power for working the whole tube in both directions. Rarified air in one-half of the tube draws a train of iron carriages, laden with parcels and mail-bags, from Euston Station to Holborn; and compressed air drives them through the other length of tube from Holborn to the general post-office—there being suction in one case, and pressure in the other: a reverse action brings trains in the other direction. This mode of transmission, in general use, would make great saving of time in delivery of letters and parcels, and desirable lessening of the number of parcels, and mail-vans and carts in over-crowded streets. But the work, so successful in a scientific and engineering point of view, remains undeveloped in a commercial sense; and this costly tube and engine-house have been unused for several years. The problem of *passenger* conveyance within a pneumatic tube was shown practicable at the Crystal Palace 1864 but nothing further has been done in the matter.

More success has attended the transmission of parcels, telegrams, and mail matter through small tubes by pneumatic pressure. The system was introduced by Siemens at Berlin, and subsequently at Paris, London, and other European cities, where it has proved efficient and highly successful, though the tubes, as a rule, do not exceed 3 in. in diameter. In the United States, Philadelphia has for a considerable time had a system of 6-in. pneumatic transmission-tubes in successful operation. In New York many attempts at such a system have been made since 1868, but attempts to obtain adequate charters have been blocked by property-owners. In 1895 a new syndicate was formed to connect the general post-office with the various stations on both sides of the East River by a system of pneumatic tubes. The tube to be carried over Brooklyn bridge presents special difficulties on account of the many turns required, as the tube must be absolutely uniform in diameter, and must have provision for lengthening and shortening, as the bridge expands and contracts with heat and cold. When the tube is completed parcels now requiring half an hour for transmission from Brooklyn post-office to the general post-office in New York will be sent in two minutes. A portion of the line from the general post-office to Station P in the Produce Exchange was successfully opened 1897, Oct. 7. The carriers, 24 in. long by a little more than 7 in. in diameter, and weighing 12 lbs., traversed the distance of a mile and one-third in 56 seconds. A franchise for a system of 8-in. pneumatic dispatch tubes was granted in Boston, 1896.

PNEUMATIC DYNAMITE GUN: machine for projecting to great distances, by means of compressed air, a shell heavily loaded with dynamite, to be exploded by impact or by time-fuse. (See CANNON: GUN: GUNNERY: ETC.) It was designed chiefly for coast defense, either on land-stations or on cruisers. For some years it had been in experimental stages, its development having been due largely to Lieut. E. L. Zalinski of the U. S. army. It was subsequently brought to comparative perfection by the immersion-and-impact fuse, invented by Henry P. Merriam, of New York, and by various improvements due to the fertile genius of Capt. John Rapieff, of the Russian artillery, afterward chief engineer of the (Amer.) Pneumatic Dynamite Gun Co. The perfected gun (one of six ordered by the Brit. govt.) made by the West Point Foundry Co., at Cold Spring, N. Y., was tested there 1890, July 8, in presence of Brit. and U. S. officers. The barrel, of five sections united, was 50 ft. long, 3 in. thick, weighing 73,000 lbs., with 15 in. calibre, and was supported by hollow trunnions, through which, from reservoirs on both sides, the compressed air (which was the projecting force) entered an iron jacket around the breech, whence by automatic valves it was admitted to act on the projectile. The air, compressed by engines, was first stored in the storage reservoir at 2,000 lbs. pressure, and from this was admitted to the firing reservoirs or boxes with 1,000 lbs. pressure, or less at will, being regulated by an automatic firing-valve. The sighting apparatus, designed by Lieut. Zalinski, was attached to the left trunnion, and consisted of telescopes so arranged as to meet all requirements, even the lateral movement of wind or current. Elevation and training to any point of the compass were operated by electric or water motor; one man could do all with his hand on a lever, except loading the projectile, which was brought into position by a carriage on a circular railway. The projectile demanded as much ingenuity as the gun, the objects being to secure safety in handling, to prevent explosion at start, to time the explosion when the purpose was to produce it under water, likewise to effect it immediately when a solid was struck. The shell had a front chamber with very complicated apparatus—a piston held by a safety latch, unlocked when the piston was depressed by atmospheric resistance (after the shell was fired); the piston was perforated by a spindle which revolved by action of air on its projecting flanges, until, owing to its screw thread, it dropped out and released a supported steel ball, that, at the instant of impact with water, fell on percussion caps; these ignited time-trains of gunpowder connecting with fulminating mercury and auxiliary gun-cotton. The piston-head itself, as well as a set of percussion caps, insured the same if the shell struck a solid such as an enemy's ship. The arrangement was such as to start the explosion at the rear end of the shell, thus increasing the pentrating power. At the trial above mentioned, July 8, dynamite was prohibited, but the results satisfied the Brit. officers. The contract required a 200 lb. shell to be thrown 3,500 yds. (about 2 m.); 520 lbs. was thrown 4,008 yds. (about 2¾ m.). A full calibre projectile weighs 1,000 lbs., of which half would be dynamite, and the range would be nearly 1½ m.; and a sub-calibre shell with 50 lbs. of dynamite could be thrown nearly 3½ miles.

The final test of the guns of the dynamite cruiser *Vesuvius* took place 1890, March 13, on the Delaware river; a 204 lb. shell, filled with gun-cotton, was thrown a third beyond the required mile, with only 700 lbs. pressure. The *Vesuvius* has 3 P. D. guns; the sub-calibre shells, 10½ in. diam., carry 201 lbs. of explosive gelatine and dynamite; the full calibre, 15 in. diam., carry 600 lbs. charge—the largest movable torpedoes made. In the Spanish-American war of 1898 the *Vesuvius* rendered effective service in bombarding Santiago de Cuba and its defenses. Seven of the new perfected guns were ordered for the U. S. govt., of which three were to be stationed at Sandy Hook, two at Fort Schuyler, and two at Fort Warren. In 1902 the government decided to provide the most important coast defences with more effective pieces of ordnance, and the pneumatic gun plant at Sandy Hook that cost nearly $1,000,000 was sold for $20,000.

PNEUMATIC TROUGH: chemical apparatus devised by Priestley, now in daily requisition in every laboratory, by which gases can be collected in vessels for experiments or examination, and can be decanted, like liquids, from one jar to another. It consists of a vessel of water, provided with a ledge or shelf two or three inches from the top. The jars in which the gas is to be collected are filled with water, and placed with their mouths downward on the shelf, which is kept a little under water to prevent entrance of air into the jars. When the edge of the jar is brought over the extremity of the tube carrying the gas, the bubbles of gas rise through the water, collect in the upper part of the jar, and displace the liquid. As soon as a jar is filled, it may be removed by sliding under its open mouth while still under water a plate or tray containing enough water to cover the edge of the jar; and oxygen and many other gases may be thus preserved for hours. Another jar full of water is substituted for the removed jar. The trough is constructed best of japanned copper; and in the shelf a groove should be made about half an inch in width and the same in depth, to admit the extremity of the gas-delivering tube beneath the jar.

PNEUMATO-: see Pneuma-.

PNEUMATOCELE, n. *nū-măt′ō-sēl* [Gr. *pneuma*, air or wind, *pneumatos*, of air; *kēlē*, a tumor]: in *surg.*, a tumor or distension filled with flatus or air.

PNEUMATOCYST, n. *nū-măt′ō-sĭst* [Gr. *pneuma*, air; *kustis*, a cyst—from *kuein*, to hold]: the air-sac or float of certain of the oceanic Hydrozoa.

PNEUMATOLOGY, n. *nū′mă-tŏl′ō-jĭ* [Gr. *pneuma*, air or wind; *logos*, a discourse]: the science of the properties of elastic fluids; the science or doctrine of mind or spiritual existences; a treatise on them. Pneu′matolog′ical, a. *-tō-lŏj′ĭ-kăl*, pertaining to pneumatology. Pneu′matol′ogist, n. *-tŏl′ō-jĭst*, one versed in pneumatology.

PNEUMATOMETER, n. *nū′mă-tŏm′ĕ-tėr* [Gr. *pneuma*, air or wind, *pneumatos*, of air; *metron*, a measure]: an instrument for measuring the quantity of air which can be taken into the lungs at one inspiration.

PNEUMATOPHORE, n. *nū-măt′ō-fōr* [Gr. *pneuma*, air; *phorĕō*, I bear]: the proximal dilatation of the cœnosarc which surrounds the pneumatocyst in the Physophoridæ.

PNEUMATOSIS, n. *nū′mă-tō′sĭs* [Gr. *pneumatōsĭs*, an inflating; *pneumatoō*, I inflate—from *pneuma*, air]: in *med.*, a windy swelling.

PNEUMO-, prefix, *nū-mo-* [Gr. *pneumōn*, a lung]: pertaining to or connected with the lungs.

PNEUMOGASTRIC, a. *nū-mō-găs′trĭk* [Gr. *pneumōn*, a lung; *gastēr*, the belly]: in *med.*, of or pertaining to the lungs and stomach; applied to a nerve, the ninth nerve, extending over the viscera of the chest and abdomen. The *Pneumogastric Nerve* derives this name from its supplying the lungs and stomach with nervous filaments; and it has a second name, *Par Vagum*, from the wandering course which it pursues. It emerges from the medulla oblongata by eight or ten filaments, which unite and form a flat cord that escapes from the cavity of the cranium (in association with the glossopharyngeal and spinal accessory nerve) by the jugular foramen. In this foramen it forms a well-marked ganglionic swelling, while another is observed immediately after its exit from the skull. The nerve runs straight down the neck between and in the same sheath as the internal jugular vein and the carotid artery. Below the root of the neck its course is different on the two sides: the right nerve running along the back of the œsophagus, is distributed to the posterior surface of the stomach, and finally merges into the solar plexus; while the left nerve runs along the front of the œsophagus to the stomach, sending branches chiefly over its anterior surface.

From anatomical considerations, based on the distribution of this nerve, and from experiments on animals, it may be concluded that this is a mixed nerve, containing filaments both of sensation and of motion. The pulmonary branches exercise a most important influence on the respiratory acts; for when the pneumogastrics on both sides have been divided above the giving off of the pulmonary branches, the most severe dyspnœa comes on, the number of respirations is much diminished, and the animal breathes as if asthmatic; after a short time, the lungs become congested and dropsical, and the bronchial tubes filled with a frothy serous fluid; and if the cut ends of the nerves are kept apart, the animal never survives above three days. The gastric branches influence the movements of the stomach, while their destruction does not materially affect the secretion of the gastric juice or the process of chylification. Loss of voice and difficulty of breathing have been frequently traced to the pressure of an aneurism or other tumor on the recurrent or inferior laryngeal. Whooping cough is ascribed by many high authorities to an affection of the pneumogastric nerve; and the violent spasmodic cough which accompanies enlarged bronchial glands, is due probably to the irritation of its pulmonary branches. The sympathy between the digestive and the respiratory and circulating organs, is explained by the anatomical relations of this nerve: e.g., both asthma and palpitation of the heart are often traceable to some deranged state of digestion. Vomiting may be excited by irritation of the central or the distal extremities of the nerve. In disease of the brain, the vomiting, often an early symptom, is caused by irritation of the central extremity; and in sea-sickness, it is that extremity also which is irritated by the disturbed state of the circulation in the cranium; and by introducing emetic substances into the stomach, the vomiting is produced by irritation of the peripheral (or distal) filaments.

PNEUMONIA, n. *nū-mō'nĭ-ă*, or PNEU'MONI'TIS, n. *-nī'tĭs* [Gr. *pneumŏnes*, the lungs—from *pneuma*, air, breath]: inflammation of the substance of the lungs. PNEUMONIC, a. *nū-mŏn'ĭk*, pertaining to the lungs; pulmonic: N. a medicine for affections of the lungs. PNEUMONITIC, a. *nū'-mŏn-ĭt-ĭk*, pertaining to pneumonitis.—*Pneumonia* is divided by pathologists into three distinct stages, corresponding to different degrees or periods of inflammatory action. The first stage is that of *engorgement*, in which the lung or a portion of it is gorged with blood, is of darker color externally, and crepitates (or crackles) less under pressure than healthy lung does; the air that ought to exist in the pulmonary cells being in a great measure replaced by fluid. On cutting the engorged portion, the section is seen to be redder than natural, and to yield a great quanity of reddish and frothy serum. The most engorged portions will generally float in water, though they are heavier than healthy lung. If the inflammation continues, new characters appear. The affected portion of the lung ceases to crepitate under pressure, and sinks when placed in water, in consequence of its now containing no air. The spongy character of the lung is gone: it is now solid, and the cut surface so resembles that of liver, that the term *hepatization*, suggested first by Laennec, is generally applied to this stage. On examining with the miscroscope a torn fragment of the hepatized lung, it will be seen to be composed of small red granulations pressing on one another, which are doubtless the air-cells clogged up, thickened, and made red by the inflammation. In the third and most advanced stage, the pulmonary tissue remains, as in the previous stage, dense, solid, and impervious to air; but its section, in place of being red, is now of reddish-yellow, or straw, or drab, or stone color, or is of grayish tint; and the little granulations, red in the second stage, are now whitish or gray, from the presence of pus or matter, which permeates through the pulmonary tissue, rendering it very soft and friable. To this stage, in reality one of *diffused suppuration*, Laennec applied the terms *gray hepatization*, or *purulent infiltration*. Morbid anatomy teaches us further that inflammation does not attack all parts of the lung on both sides indiscriminately. It is much more common on the right side of the body than the left. Of 210 cases collected by Andral, 121 were on the right lung alone, and 58 on the left side alone; while in 25 it was double (i.e., in both lungs), and in six the seat was uncertain; so that P., is more than twice as common on the right sides as on the left, and occurs on both sides together only once in eight times. According to Grisolle, however, whose *Traité Pratiqae de la Pneumonie* is the standard work on this disease, the relative frequency with which the right lung is affected is rather less than two to one (11 : 6). Moreover, P. is considerably more common in the lower than in the upper lobes of the lung—a point of great importance in diagnosis. Of 88 cases observed by Andral, the inflammation was found to affect the lower lobe 47 times; the upper lobe 30; and the whole lung at once 11. Inflammation of the bronchial tubes so constantly accompanies inflammation of the tissues of the lung, that though bronchitis exists often without P., P. never occurs without bronchitis. Moreover, a certain amount of Pleurisy (q.v.) or inflammation of the investing membrane, accompanies P. in a very large majority of cases. The alterations which take place in the tissue of the lung give rise to important modifications of the ordinary sounds yielded by auscultation and percussion; whose discrimination belongs to the physician.

The following are the general symptoms, as distinguished from the physical signs, of P.: The disease commences usually with inflammatory fever; and pain in the side, due to pleurisy in most cases, soon supervenes. The breathing is always more or less affected, especially when the upper lobe is inflamed. According to Prof. Gairdner, the dyspnœa of *pure* P. is a mere *acceleration* of the respiration, without any of the heaving or straining respiration observed in bronchitis, or in cases where the two diseases are combined. Delirium is a very frequent, and always a dangerous symptom, indicating that the due arterialization of the blood is much interfered with, and that the impure circulating fluid is affecting the brain. The cough is usually dry at first, but in a few hours it is accompanied by expectoration of sputa so characteristic as to afford almost certain evidence of the disease. On the second or third day the expectoration, which previously consisted of merely a little bronchial mucus, consists of transparent and tawny, or rust-colored sputa, which unite in the vessel containing them into one gelatinous mass. The color is owing to the complete blending of the blood and mucus, and in proportion to the quantity of the former, the sputa is more or less deeply tinged. So long as the expectorated matter flows readily along the side of the vessel when it is tilted, there is reason to believe, unless physical signs show otherwise, that the inflammation is still in the first stage; but when the sputa are so viscid that the vessel may be inverted and strongly shaken without their being detached, there is reason to fear that the P. has reached the second stage. If improvement now commences, the sputa become less tenacious, less rust-colored, and gradually like the expectoration of common catarrh. But if the disease advances, the rust-colored sputa, though in less quantity, may go on to the end; or there may be no expectoration, either on account of its own tenacity, or of the patient's want of power to eject it, in which case the air-passages are gradually filled, and death from suffocation occurs; or there may be the expectoration of a fluid of the consistence of gum-water, and of a brownish-red color (resembling prune-juice), which, according to Andral, affords strong evidence that the disease is in its third stage; or, lastly, pure pus may be excreted during the third stage.

In its first and second stages this disease is moderately amenable to treatment. Whether when the lung has reached the third stage it is still susceptible of repair, we cannot tell, because we have no certain sign of the commencement or establishment of this third stage during life, though we may guess that it is established, if the face has become very pale and corpse-like; if there is the prune-juice or purulent expectoration; and if the disease has lasted for a sufficient time to have advanced so far, though it is scarcely possible to state what the necessary time is. The average duration of P. may be placed at ten days or a fortnight.

Sometimes no cause of this disease can be traced. Very often it is the consequence of exposure to cold, especially when the body was previously heated by exercise; but why such exposure should in one person cause P., in a second pleurisy, in a third pericarditis, and in a fourth peritonitis, is not known.

The treatment should be under professional direction, and in the first stage involves an antiphlogistic regimen generally. In the second stage, if there is great depression of the vital powers, indicated by feeble and irregular pulse, and other ordinary signs of sinking, it will be requisite to administer stimulants, such as wine and carbonate of ammonia, and to feed the patient on beef-tea.

There are few diseases in which assiduous and unceasing nursing is more important than in P. Especially during convalescene must the patient be watched closely; for the convalescence is often rather apparent than real. 'A patient can never be pronounced perfectly secure so long as any trace of crepitation remains in the affected lung, and this may often continue long; nay, it not unfrequently ceases only on the supervention of another more surely fatal though less rapid disorder—tubercular consumption.

PNEUMOTHORAX, n. *nū'mō-thō'răks*, or PNEU'MATOTHO'RAX, n. *-mă-tō-thō'răks* [Gr. *pneuma*, air; *thōrax*, the chest]: the escape of air or gaseous effusion into the pleura through a laceration of the lung.

PNYX, n. *nĭks* [Gr. *pnux*]: the place west of the Acropolis in anc. Athens where the *ekklesiai* or meetings of the people were held.

PO, *pō* (anc. *Eridanus* and *Padus*): largest river of Italy; rising in two springs on the n. and s sides of Monte Viso, one of the Cottian Alps, close to the French frontier; lat. about 44° 40′ n. It flows e. more than 20 m.; and arriving before Saluzzo, it emerges from its rocky defiles, and enters upon the plain, flowing n.n.e. past Turin; and at the town of Chivasso, turning e. to its embouchure in the Adriatic. More than 50 m. above its mouth, it begins to form its delta, the principal branches being the *Po della Maestra*, on the n., and the *Po di Primaro* on the s. The unhealthy marsh of the *Valli de Comacchio* extends immediately n. of the Primaro branch. The Po receives from the left, the Dora Riparia, Dora Baltea, Sesia, Ticino, Adda, Oglio, and Mincio; from the right, the Tanaro, Bormida, Trebbia, Taro, Parma, Enza, Secchia, and Panaro. At Turin, the Po is about 750 ft. broad; at Pavia, 1,050 ft.; at Cremona, 2,650 ft.; below Polesella, after throwing off the Po di Primaro branch, its breadth is about 850 ft. Its total length is 400 m.; it becomes navigable for small barges 60 m. from its source, and drains nearly 40,000 sq. miles.

PO'A: see Meadow Grass.

POACH, v. *pōch* [OF. *pocher*, to thrust or dig out with the fingers—land was said to be poached when it was trodden into holes and mire by heavy cattle: F. *pocher*, to bruise (see Poke 1)]: to intrude or encroach upon the grounds of another to steal or plunder, especially game; to take game by unlawful means; to plunder by stealth; to cook by boiling slightly, as eggs broken and poured among boiling water, or cooked with butter. **Poach'ing**, imp.: N. trespass in pursuit of game; the employment of a poacher (see below). **Poached**, pp. *pōcht:* Adj. stolen; slightly boiled or dressed, as eggs broken among boiling water. **Poach'er**, n. *-ėr*, one who steals game. **Poach'y**, a. *-ĭ*, wet and soft, as land; swampy. **Poach'iness**, n. *-ĭ-nĕs*, state of being wet and soft, as land; swampiness. *Note.*—Skeat suggests that a 'poached egg' is the same as 'pouched egg'; the egg is likened to a pouch, because the art is to dress it in such a way as not to let the yolk escape. F. *pocher* may in this case be derived from *poche*, a pouch.

POACHARD, *pōch'ėrd*, or **Pochard**, n. *pō'chėrd* [from Poach]: species of duck: see Pochard.

POACH'ING: not strictly a legal term, yet in such wide popular use in Great Britain that it is frequently used in legal works, to denote trespassing on another's lands to catch or pursue game; likewise to denote the cognate offense of unlawfully catching or pursuing fish in another's waters. The British laws are voluminous and severe on this class of offenses; and the customary defense of this severity is based on the statement that P. is only stealing under a milder name—game being as really the fruit of the soil as apples; and further, that the transition from P. to actual stealing is easy and even inevitable. See Game, for the general law; and particularly for English laws, Oke's *Game Laws*, by Bund, 7th. ed. See also Paterson's *Fishery Laws*, and Oke's *Fishery Laws*, by Bund, 2d. edition.

POACITES, n. plu. *pō'ă-sīts* [Gr. *poa*, grass]: in *geol.*, fossil monocotyledonous leaves; a general term for fossil grass-like leaves.

POCAHONTAS, *pō-ka-hŏn'tas:* Indian princess: about 1595–1616, Mar. 21; b. Va ; daughter of Powhatan, who was chief of a confederacy of more than 40 clans of Indians of Algonquin connection and speech, whom Captain John Smith, in the first year of the planting of the English colony in Va. (1607), found in possession of all Va. below the falls of the James and Chickahominy rivers. In exploring the upper course of the Chickahominy, and venturing inland with a single Indian guide, Smith was captured, 1607, Dec., and, as he told the story, escaped death, after a formal condemnation, only by the intervention of P., then a girl of about 12 years, who threw herself upon him just as her father's club was raised to dash out his brains. Doubt has been thrown on the story on the ground that of three narratives of Smith's experience, only the third, 12 years after the events, and not wholly by him, has any reference to the romantic incident. To this, the reply is made that part in the earlier narratives is known to have been suppressed, and that indications point to the paragraph relative of Powhatan's unfriendly action as having been omitted lest it should discourage emigration to Va. Smith was detained seven weeks in captivity, and then sent home in charge of 12 Indian guides. The friendly interest of P. was later shown, 1609, by a visit to the colony to give Smith news of an intended Indian attack, and by the supplies of corn sent by her on several occasions. Capt. Argall, an adventurer seeking trade with the Indians on the Potomac, found means to capture P., with the aid of a chief there whom he bribed with a brass kettle; and her detention at Jamestown, where Argall carried her, would have made trouble for the colony, had not a young Englishman, John Rolfe, a respectable colonist who had won her favor, made an offer of marriage, to which Powhatan willingly consented. P. was baptized as Rebecca, was wedded 1613; and 1616 was taken to England with her husband and several Indian attendants. She was greatly admired for her modest and graceful demeanor, and, on Smith's report of her services to himself and the colony, was made recipient of many social attentions, being entertained by the Bp. of London, and presented by Lady De la Warr to King James. As an Indian princess, she was styled Lady Rebecca. Her husband was provided with the office of sec. to the colony. P. never learned to write. She died of small-pox at Gravesend, just as she was about to return to Va. An infant son, Thomas Rolfe, survived, and through him, many leading families of Va., e.g., the branch of the Randolphs from which John Randolph of Roanoke was descended, trace descent from the princess.

POCHARD, *pō'chėrd,* or Poachard, *pōch'ėrd* (*Fuligula*): genus of ducks, of the oceanic section (see Duck), having the bill as long, or nearly as long as the head, broad and very flat, a little dilated toward the tip, the lamellæ of the upper mandible not projecting beyond the margin, the wings and tail short, the tail rounded. The windpipe of the male, in all the the pochards, terminates in a labyrinth composed partly of bone and partly of membrane. There are numerous species, some of them natives of the arctic regions; some found, at least in winter, on the coasts of most parts of N. America, Europe, and Asia; and some in the s. hemisphere.—The Red-head or American Pochard (*F. ferina americana*) has the iris orange, and the head and neck of pure chestnut, with bronzy or coppery-red reflections, whereas the Canvas-back (for which it is often sold) has the head and neck dark reddish-brown, dusky on top and around the bill.—The European Pochard (*F. ferina*), known also as the Dun Bird, Red-headed Poker, and Red-eyed Poker, has the same fine waved lines on the back as the two above mentioned, but the ground is white, as in the Canvas-back, which, however, has the lines mostly broken up into little chains of dots. The European P. is smaller than the mallard, but rather larger than the wigeon. The head and neck are bright chestnut, the eyes red, like the eyes of the Canvas-back. It is esteemed for the table. Great numbers are sold every winter in the London market. —The TUFTED DUCK (*F. cristata*) is a frequent winter visitant of bays, estuaries, and lakes of Britain; it is a plump and short bird; black, with a white bar on the wing; the breast, belly, and sides white; and the occipital feathers are elongated.—The CANVAS-BACK DUCK (*F. Valisneria*) of N. America is a species of P., very like the Common P., but much larger, with the bill higher at the base, and less dilated toward the tip. The upper parts are whiter. The Canvas-back Duck breeds in n. parts of America, and migrates southward in flocks in autumn. In winter it abounds on the Chesapeake and its tributaries, and is common southward to New Orleans, often collecting in very large flocks, particularly toward evening. It is very shy, but vast numbers are killed, as it is in very high esteem for the excellence of its flesh, due to feeding, in some localities, on *Vallisneria spiralis* (Tape-grass, Eel-grass, called Wild Celery); otherwise the flesh has no claim to superiority. Of the same genus are the Greater and the Lesser Scaup Ducks and the Ring Neck, all of N. Amer. Some have separated these as *Fulix*, the Canvas-back as *Aristonetta*, and the Crested Pochards as *Fuligula*.

Pochard (*Fuligula ferina.*)

Canvas-back Duck (*Fuligula valisneria*).

POCK, n. *pŏk* [Dut. *pocke*, a pustule or bubble, as of morbid matter on the flesh: Ger. *pocke;* AS. *poc*, a pock]: a pustule or small bubble on the skin full of morbid matter in an eruptive disease, as the small-pox. POCKY, a. *pŏk'ĭ*, infected with small-pox; full of pocks. POCK'INESS, n. *-ĭ-nĕs*, the state of being full of pocks. POCK-MARK, one of the pits or scars left by the small-pox. POCK-PITTED, marked by the scars left by small-pox. POCK-PUDDING [see POKE 2]: in *Scot.*, a pudding, generally of oatmeal, cooked in a cloth bag or covering; a glutton; an opprobrious epithet applied by old Scotch writers to Englishmen.

POCKET, n. *pŏk'ĕt* [F. *poche;* Guernsey, *pouquette*, a small sack: O.Norm. *poque;* Dut. *poke*, a pocket]: a small pouch or bag attached to or inserted in a garment; in *billiards*, one of the nets that receive the balls; a certain quantity contained in a bag, as of hops: V. to put or conceal in a pocket; to take secretly. POCK'ETING, imp. POCK'ETED, pp. POCK'ETFUL, n. *-fûl*, plu. POCK'ETFULS, as much as a pocket will hold. POCKET-BOOK, a case containing a memorandum-book, loose papers, etc. POCKET-GLASS, a portable looking-glass. POCKET-HANDKERCHIEF, a napkin of silk, linen, or cotton carried in the pocket for use. POCKET-KNIFE, a knife with one or more blades which fold into the handle. POCKET-MONEY, money allowed for occasional or petty expenses. POCKET-PICKING, the act or practice of stealing from the pocket. POCKET-PISTOL, a firearm that can be carried in the pocket; *familiarly*, a flask of liquor carried in the pocket. TO POCKET AN INSULT OR AN AFFRONT, not to resent it or seek redress. POCKET OF HOPS, a bag of hops—from ½ to 2 cwts.

POCO, ad. *pō'kō* [It.]: in *music*, a term indicating the measure of the time, force, movement, etc., and signifying a little: e.g., *poco animato*, rather animated; *poco forte*, abbreviated *pf.*, rather loud; *poco a poco*, by degrees, little by little; *poco a poco crescendo*, becoming loud by degrees; *poco a poco rallentando*, becoming slower by degrees.

POCOCK, *pō'kok*, EDWARD, D.D.: eminent Oxford prof. of oriental languages: 1604, Nov. 8—1691, Sep. 10; b. and d. Oxford, England. He graduated there 1622; edited the Syriac versions of II Pet., and II and III John; pursued his study of oriental languages while English chaplain at Aleppo 6 years; returning 1636, when he was made prof. of Arabic at Oxford. He visited Constantinople 1637–39 seeking MSS.; afterward, while holding his chair at the univ., was appointed rector of Childrey, Berkshire (1643), and nominated prof. of Hebrew and canon of Christ Church, 1648. Among his publications were an annotated edition, with Latin translation, of portions of the Arabic writings of Abulfaragius, under the title *Specimen Historiæ Arabum* (1648-50);—his chief work being his edition of *Gregorii Abul Farajii Historia Dynastiarum*, Oxford 1663, discourses on the Mishnah commentaries of Moses Mainonides, entitled *Porta Mosis* (1655), Latin translations of the *Annals* of Eutychius (1658); Arabic translation of the *De Veritate* of Grotius; Latin translation of poem by Ismael Thograi; Arabic translation of the Church catechism and liturgy; commentaries on the prophets Micah, Malachi, Hosea, and Joel (1677–91). He gave important aid in preparation of Walton's Polyglot Bible (1657), being consulted throughout by Walton. His life and theol. writings were edited by Leonard Twells (1740). One of his sons, Edward, was author of translations from the Arabic; and another, Thomas, from the writings of Menasseh ben Israel.

POCULIFORM, a. *pŏk'ū-lĭ fawrm* [L. *poculum,* a cup; *forma,* a shape]: in *bot.,* cup shaped.

POD, n. *pŏd* [Dan. *pude,* a pillow: Esthon. *paddi,* a cushion, a pad: Bret. *pod,* a pot: of Celtic origin—comp. Gael. *put,* a large buoy]: the pericarp or seed-vessel of such plants as the pea, bean, etc. (see LEGUME): V. to swell or fill, as a pod; to produce pods. POD'DING, imp. POD'DED, pp.

POD-: see PODO-.

PODAGRA, n. *pŏd'ă-gră* [L. and Gr. *podagra,* gout in the feet—from Gr. *pous* or *poda,* a foot; *agra,* a seizure]: the Gout (q.v.). PODAG'RIC, a. *-ăg'rĭk,* or PODAG'RICAL, a. *-rĭ-kăl,* pertaining to the gout; gouty.

PODARGUS *pō-dâr'gŭs:* genus of birds of family *Caprimulgidæ* nearly allied to the true Goat-suckers (q.v.), but having no connecting membrane at the base of the toes, and the middle toe not pectinated. Some interesting species are natives of Australia, strictly nocturnal in their habits, and remarkable for the difficulty with which they are roused from their sleep by day. *P. humeralis* may be pushed off a branch, and seems scarcely to waken so as to save itself from falling to the ground; and if two are sitting together, as is usually the case, one may be shot without its mate being much disturbed. But by night this bird is all activity.—*P. Cuvieri,* disturbs the night by a hoarse cry, resembling the syllables *More Pork,* by which name it is therefore known in New South Wales.

PODESTA, n. *pō-dĕs-tâ'* [It. *podestà*—from L. *potestas,* power, authority]: Italian municipal magistrate. The name was applied first to foreign magistrates with supreme authority, whom Emperor Frederick Barbarossa placed over the Italian towns, after subjugating them. In the 13th and 14th c. an officer bearing the same designation appears, at first occasionally, like the Roman dictator, afterward in most Italian cities as a permanent magistrate, appointed either by the constituent parliament, or by the Great Council; he superseded all the ordinary magistrates, the military officers, and occasionally the judges. The cause of appointing such an officer was the jealousy between the richer citizens and the nobles; the P. was a stranger, generally belonging to the nobility, and prohibited during his term of office from forming any intimate connections in the city which he governed. His chief duty was the execution of summary justice on the lawless barons; and in the great Lombard towns he generally obtained a predominance for the citizens. Occasionally, however, the P. became too strong for both parties, securing his re-election during a succession of years, and becoming the despotic ruler of the city.—The name is given in many Italian towns to an inferior municipal judge.

PODETIUM, n. *pŏd-ē'shĭ-ŭm* [Gr. *pous* or *poda*, a foot]: a stalk-like elevation, simple or branched, rising from the thallus in some lichens.

PODGE, n. *pŏj* [Ger. *patsche*, a puddle, mire: Bav. *batzen*, a lump of soft materials]: a puddle; prov. Eng. for *porridge.* HODGE-PODGE, a mixed mass; a medley of ingredients: see HODGE-PODGE. PODGY, a. *pŏj'ĭ*, dumpy and fat.

PODGORITZA, *pŏd-gō-rĭt'sâ:* fortified town of Montenegro, in the district ceded to Montenegro by Turkey in terms of the treaty of Berlin; about 35 m. n. of Scutari. Pop. about 7,500.

POD'ICEPS: see GREBE.

PODIEBRAD, *pod-yă'brâd*, AND KUNSTAT, *kûn'stât*, GEORGE BOCZKO OF: powerful Bohemian noble, of the Hussite party: 1420–1471, Mar. 22; son of Herant of Kunstat and Podiebrad. While still a youth he threw himself, with all the ardor and resolute force of his nature, into the Hussite struggles. Like the rest of his family, however, he adhered to the moderate party of the Hussites during the govt. of King Sigismund; but when, on the death of that monarch, the Rom. Cath. barons (1438) carried the election of Albrecht V. of Austria (II. of Germany), P. allied himself with the Utraquist Orders in Tabor, and offered the sovereignty of Bohemia to Casimir, King of Poland. Albrecht immediately declared war against him, and invested Tabor, but was forced by P. to raise the siege, and retire to Prague. From this time P.'s influence was firmly established among the Utraquists; next to Lipa, he was the first man of the party. When Albrecht died (1439) Lipa was appointed regent during the minority of the new king Ladislas; but five years later Lipa died, and P. obtained the government of the country. He, however, was ambitious for the royal dignity In 1449 he one night seized the capital, drove away all the Rom Cath. barons, and even imprisoned his colleague in the regency, Meinhardt von Neuhaus. This outrage led to a year or so's fighting—the final result of which was that P. was acknowledged gov. or regent by the whole of Bohemia. On the death of Ladislas 1457, P. managed to be chosen his successor, and was crowned 1458, May 7. From this period he began to show the full power of his administrative genius. He reorganized the forms of education and religion, and strove to bring about a peaceful settlement of the religous dissensions that had desolated the land. He even went the length of respectfully soliciting the papal co-operation in his humane endeavors; but the pope would have no dealings with this Samaritan ruler, and 1463, Dec., publicly proclaimed him a heretic. All the neighboring princes sent letters to Rome, exhorting or imploring the pope to moderation; but the only answer which Pius II. gave them was placing P. under the ban of the Vatican. Shortly afterward Rudolf, the papal legate, excited the Rom. Catholics of Bohemia to insurrection. P. tried every means of conciliation, but in vain. 1466, Sep., a German Rom. Cath. army burst into Bohemia, but this host of pseudo-crusaders was annihilated at Riesenberg. Once more Pius excommunicated P., and in addition induced Mathias (q.v.) of Hungary to invade Moravia. The Bohemian king appealed to a universal council, but he also prepared to meet force with force. Summoning back from abroad the banished Taborite warriors, he crushed the insurrection, and compelled his enemies to grant him an advantageous armistice. In 1467 his son Victorin, on the renewal of hostilities, invaded and devastated Austria, while the Hungarians who had invaded Bohemia were surrounded at Vilemov, and forced to cease from hostilities. In spite of the magnanimity shown by P. on this occasion, Mathias acted falsely toward him; and in the following year had himself crowned King of Bohemia and Markgraf of Moravia. P., instantly summoned the Bohemian diet and proposed to the assembled orders that they should take the king of Poland as his successor, while his own sons should merely retain the family possessions. By this means he obtained the Poles for allies; Emperor Friedrich also declared in his favor, while his Rom. Cath. subjects were reconciled to him, so that the Hungarians found it advisable to conclude a peace. After his death his sons, Victorin and Henry of Münsterberg, fell back into the ranks of the Bohemian aristocracy; but in the stormy days that followed they rendered good service to their native land.

PODIUM, n. *pō'dĭ-ŭm* [L. *podĭŭm*, a balcony]: pedestal continued horizontally to form a low wall on which columns may be set. Like the pedestal, it has a lease, die, and corona, all continued. When the P. breaks forward so as to form a pedestal for a column, it is called the Stylobate.

PODO-, prefix, *pŏd-o-* [Gr. *pous*, *podos*, a foot]: belonging to, connected with, or situated on or near the foot.

PODOCARP, n. *pŏd'ō-kârp* [Gr. *pous* or *poda*, a foot; *karpos*, fruit]: in *bot.*, the stem supporting the fruit.

PODOCARPUS, *pŏd-o-kâr'pŭs:* genus of trees of nat. order *Coniferæ*, sub-order *Taxineæ*, the order *Taxaceæ* of some botanists. The leaves, like those of the allied Gingko tree, have remarkable resemblance to the fronds of ferns. The species are natives of New Zealand, the South Sea Islands, and the Indian archipelago. Some are valuable timber trees. *P. cupressina*, one of the best timber trees of Java, found also throughout the neighboring islands and the South Sea Islands is a beautiful tree, 50 to 80 ft. high, with spreading pendulous branches; the wood is yellowish, and takes a very fine polish. *P. totarra*, the TOTARRA, or TOTARRA PINE, the most valuable timber tree of New Zealand, grows in the s. parts of New Zealand, and its trunk has been known to attain a diameter of 12 ft. Its wood is equal to the best Baltic pine in durability and for ship-building.

The wood of *P. elatus*, the GAGALI of the Fijians, is peculiarly elastic.

PODOCEPHALOUS, a. *pŏd′ō-sĕf′ă-lŭs* [Gr. *pous* or *poda*, a foot; *kephălē*, the head]: in *bot.*, having a head of flowers elevated on a long peduncle.

PODOGYNE, n. *pŏd′ō-jĭn*, or PODOGYNIUM, n. *pŏd′ō-jĭn′ĭ-ŭm* [Gr. *pous* or *poda*, a foot; *gŭnē*, a woman]: in *bot.*, a fleshy and solid projection which serves to support the ovary, with which it is continuous.

PODOLIA, *pō-dŏ′lĭ-a*, or KAMINETZ, *kâ′mē-nĕts:* government of West or 'White' Russia, n. of Bessarabia, and bordering on the Austrian frontier; 16,170 sq. m. The surface is a table-land, strewn with hills, and containing many beautiful districts. Nearly three-fourths of P. is either arable or available for pasturage. Great quantities of corn and fruits, especially melons, are produced, and the fine climate is favorable to the growth of the vine and mulberry. Hemp, flax, and tobacco are cultivated with success, and the rearing of bees is an important industry. So rich and strong is the grass in the pastures or prairies, that the immense heads of cattle can hide themselves from view in it. The population is composed of various races, who live together unmixed. The Russniaks (formerly 'serfs') make up the majority, and number over a million; next come the Cossacks; and then the Jews, who almost all are traders. The aristocracy are Poles; the officials and soldiery, Russians. Pop. (1890) 2,604,800; (1897) 3,031,513.

PODOLOGY, n. *pŏ-dŏl′o-jĭ* [prefix, *podo-;* Gr. *logos*, a word, a discourse]: treatise on or description of the foot.

PODOPHTHALMA, n. plu. *pŏd′ŏf-thăl′mă*, or PODOPHTHALMATA, or PODOPHTHALMIA [Gr. *pous* or *poda*, a foot; *ophthal′mos*, the eye]: division of malacostracous crustacea, part of the *Malacostraca* of Cuvier, including the orders *Decapoda* (Crabs, Lobsters, etc.) and *Stomapoda* (Shrimps, etc.). A distinguishing character, from which they derive their name, is their stalked and movable eyes. The stalks of the eyes are short in many, but very long in some, of which a beautiful example is presented by the Sentinel Crab of the Indian Ocean.—P. in *conch.* is a division of vostriferous gasteropods with eyes at the ends of cylindric peduncles.

Sentinel Crab.

PODOPHYLLIN, n. *pŏd'ō-fĭl'lĭn* [Gr. *pous* or *poda*, a foot; *phullon*, a leaf]: resin obtained by means of rectified spirit from the root of *Podophyllum peltatum*, or *May-apple*, a plant common throughout the United States. This resin, a pale greenish amorphous powder, is an active purgative, and seems to have the power of relieving the liver by exciting copious bilious discharges. As its activity seems to vary in different patients, it is better to begin with a small dose of half a grain, which may be combined with something to prevent its griping. Pod'ophyl'lous, a. *-fĭl'lŭs*, in *entom.*, having the feet or locomotive organs compressed into the form of leaves.

PODOPHYLLUM, *pŏd-ō-fĭl'lŭm:* genus of plants variously ranked by botanists in the nat. order *Ranunculaceæ*, or made the type of a small distinct order, *Podophylleæ* or *Podophyllaceæ*, differing from *Ranunculaceæ* chiefly in having a solitary carpel. The genus P. has 3 sepals, 6 to 9 petals, 12 to 18 stamens, a broad round stigma, seated almost on the top of the germen, and a many-seeded berry. *P. peltatum* is a perennial, with a solitary white flower in the axil of the two leaves; the fruit oval, an inch and a half long, smooth, yellowish, succulent, having a mawkish sweet and subacid taste. It is common in N. America, growing in moist woods and on the shady banks of streams, and is known as May-apple, because it flowers and ripens its fruit very early in summer; it is called also *Hog-apple* and *Wild Lemon*. The fruit may be eaten, but is not agreeable. All the other parts are actively cathartic: see Podophyllin.

PODOSPERM, n. *pŏd'ō-spėrm* [Gr. *pous* or *poda*, a foot; *sperma*, seed]: the filament or thread by which the ovule adheres to the placenta.

PODURA, *pō-dū'râ:* genus of small wingless insects of order *Thysanoura* (q.v.), having a linear or cylindrical body, a distinctly articulated thorax, rather long antennæ, and a long abdomen, terminating in a tail, which divides at its extremity into two branches. They bend the tail beneath the abdomen, and by suddedly extending it, make prodigious leaps. Hence their popular name, Spring-tail. The species of this and allied genera are numerous; some are found on plants, some under stones and in other damp places, some on the surface of stagnant waters. Their bodies are covered with scales, which are very interesting, and are among the favorite test-objects for the powers of microscopes.

Podura villosa.

POE, *pō*, Edgar Allan: perhaps the most original poetical genius yet produced by America: 1809, Feb. 19—1849, Oct. 7; b. Boston. His father, son of Gen. Poe, a distinguished officer in the revolutionary army, was educated for the law, but, falling in love with a beautiful English actress, he married her and went upon the stage. In a few years the youthful couple died at nearly the same time of consumption, leaving three children entirely unprovided for. Edgar, the second child, was adopted by John Allan, a rich childless merchant. In 1816 the boy went to England with Mr. and Mrs. Allan, and was sent to a school at Stoke Newington. In 1821 he returned to America, and attended an academy at Richmond, Va. In 1826 he entered the Univ. of Charlottesville, where he was a very successful student, but quitted it at the end of a year, deeply in debt, chiefly through his passion for gaming. For a year or two he remained quietly at home: the story of his having gone to assist the Greeks in their heroic efforts to throw off the yoke of their Turkish oppressors has no other foundation than the fact that his elder brother, who had gone to sea, fell into some trouble with the police at St. Petersburg, from which he was rescued by the U. S. minister. In 1829 Poe published a volume of poems, his first known essay in literature, under the title *Al Aaraaf, Tamerlane,* and other poems. He then expressed a wish to enter the army, and Mr. Allan exercised his influence to secure him a cadetship in the Milit. Acad. at West Point. Here he grossly neglected his duties, drank to excess, and was finally cashiered, 1831, Mar. 6. In the same year he published an enlarged collection of his poems, dedicated to the U. S. Corps of Cadets. Returning to Richmond, Poe was kindly received by Mr. Allan, who had become a widower and married a second wife. It is related that Poe's conduct to this lady was such that Mr. Allan had to eject him from his house, but there is some reason for deeming this a calumny. It is certain, however, that Mr. Allan had some strong reason for displeasure with Poe, and at his death 1834, he left him unmentioned in his will. Thus thrown upon his own resources, Poe turned to literature as a profession. In 1833 the publisher of a Baltimore magazine having offered prizes for the best prose story and the best poem, Poe competed, and won both prizes. This led to his friendship with John P. Kennedy, one of the prize committee, who procured him literary employment in connection with the *Southern Literary Messenger* at Richmond. While here, Poe married his cousin, Virginia Clemm, a beautiful and saintly creature, as destitute as himself, who died 1848. He was tenderly attached to her; and her years of illness, with their necessarily large drain of his scanty resources and their constant heavy burden on his heart, may have increased his natural morbidness. In 1837 he removed to New York, where he lived by contributing to the *New York Quarterly Review* and other periodicals, and where 1838 he published *The Narrative of Arthur Gordon Pym.* In 1839 he became editor of *The Gentleman's Magazine* at Philadelphia, and published a collection of his best stories with the title, *Tales of the Arabesque and Grotesque.* The next few years were spent in similar literary employment, chiefly at New York; the year 1845 being marked by the appearance of his famous poem, *The Raven* (for which, as is recorded, he received ten dollars); and 1848, by the publication of *Eureka, a Prose Poem,* in which he endeavored to elaborate a system of cosmogony. In 1849 he went to Richmond. and it is said became engaged to a lady of wealth. Oct. 4 he left Richmond by train, which he quitted at Baltimore. Some hours later he was discovered insensible in the streets, and taken to the hospital, where he died. The ordinary explanation of his condition at Baltimore is that he had met some old associates and drunk himself into helpless intoxication.

Few careers so dark and disastrous as that of Poe have place in all the sad records of genius. There is no doubt that Griswold in his life of Poe has been guilty of imputing to him a most exaggerated moral depravity; but the fact remains that the failure of his life was mainly occasioned by his habits of frantic dissipation. There was about Poe a strange fascination; his friends loved him—those best who best knew him, and knew him in his wretchedest aberrations. By his wife and her mother he was regarded through all with an obstinacy of tender affection, not for an instant to be shaken.

Whatever may be thought of his morals, of his genius there is little question. In his poetry, slight in substance as for the most part it is, small in quantity, and limited in range, there is that which ranks it above everything of this kind which his country has produced. Except for some traces of imitation in its earlier specimens, his verse is eminently a peculiar and individual product. In keen, clear, lyrical quality, the music of Poe at his best is scarcely surpassed by that of any other poet. Many of his short prose tales are wildly and weirdly impressive, though too frequently indulging by morbid preference in ghastly and painful effects. Over very much that he has written, alike in prose and in verse, there broods a significant shadow of misery and hopeless portentous gloom. A much more favorable view than usual of P.'s character is taken by Ingram in the memoir accompanying his ed. of Poe's works (4 vols., Edin. 1874); as also in his separate biography, *Edgar Allan Poe, his Life, Letters, and Opinions* (1880). Stoddard prefixed a memoir to a collection of his poems (1875).

POE, Orlando Metcalfe: b. Navarre, Stark co., O., 1832, March 7: soldier. He graduated at West Point 1856, and was assigned to the engineer corps. He was attached to the survey of the lakes when the civil war began. As col. of the 2d Mich. volunteers he took part in the Virginia peninsular campaign; was commissioned brig. gen. of volunteers, 1862, and commanded a division 1863; became captain of engineers 1863, March; was with Sherman as chief of engineers in the march to the sea. He received successively the brevets of maj., lieut. col., col., brig. gen., and maj. gen. in the regular army, and 1891 holds the actual rank of col. of engineers. He d. 1895, Oct. 2.

PO'E BIRD: see Honey-eater.

PŒCILOPOD, n. *pē-sĭl'ō-pŏd* [Gr. *poikĭlos*, variegated; *pous* or *poda*, a foot]: a crustacean having various kinds of feet—applied to the king-crabs.

POEM, n. *pŏ′ĕm* [F. *poëme*—from L. *poēma;* Gr. *poiēma*, a composition in verse; *poiētēs*, a poet—from *poiĕō*, I make: comp. O.Scot. *maker*, a poet]: a composition in verse; the literary production of a poet (see Poetry). Poesy, n. *pō′ĕ-sĭ*, poetry; metrical composition; the art of composing poems; a short conceit engraved on a ring—also spelled Posy, n. *pō′zĭ*. Poet, n. *pō′ĕt*, the author of a poem; one who has the gift of writing poetry. Poetess, n. fem. *pō′ĕt-ĕs*, a women gifted with poetic genius. Poet laureate, n. *law′rĕ-āt* [L. *laurĕātus*, crowned with laurel—from *laurĕa*, the laurel-tree]: in *Britain*, a salaried officer of the royal household, formerly required to write an ode on the king's birthday or other special occasion—the office is now conferred on an eminent poet (see Laureate). Poet musician, an ancient bard and lyrist. Poetaster, n. *pō′ĕt-ăs′tėr* [It. *poetastro*, a poetaster]: a petty poet; a pitiful rhymer; a rhymster. Poetic, a. *pō-ĕt′ĭk*, or Poet′ical, a. *-ĭ-kăl*, relating to poetry; expressed in poetry; marked by poetic language or imagery; figurative; imaginative. Poet′ically, ad. *-lĭ*. Poetics, n. plu. *pō-ĕt′ĭks*, the branch of criticism relating to poetry. Poetize, v. *pō′ĕt-īz*, to make verse; to compose verse, as a poet. Po′etizing, imp. Po′etized, pp *-īzd*. Poetry, n. *pō′ĕt-rĭ*, embodiment of thoughts and emotions in a measured musical flow of words; striking thoughts, picturesque situations, and generally the full play of the imagination expressed in metrical compositions; prose composition expressed in the vivid language of the imagination and of the feelings; verse; rhyme; metrical compositions (see below). Poetical justice, that ideal justice which poets and novelists mete out, making the good and innocently unfortunate, finally happy, and consigning the evil and the bad to condign punishments.

POEPHAGA, n. *pō-ĕf′ă-gă* [Gr. *poa*, grass, herbage; *phagein*, to eat]: in *zool.*, a group of the marsupials. Poeph′agous, a. *-ă-gŭs*, eating grass.

POERIO, *po-ā′rē-o*, Carlo: Italian patriot: 1803, Dec. 10—1867, Apr.; son of Giuseppe P., Baron Belcastro, distinguished for love of liberty and for sufferings in her cause. The father, the Baron (1775–1843, b. Belcastro in Calabria), took part in the Neapolitan revolution of 1799, and suffered inprisonment; and for his part in the revolution of 1820, Ferdinand handed him over to the Austrians: from this exile he returned 1833 to Naples. He left two sons, the elder, Alessandro P. (1802–48), poet and patriot; and Carlo, the subject of our notice. Carlo was educated with great care, and trained to patriotism even from infancy. In 1828 he joined the liberals of Naples in the conspiracy of Avellino, for which he was imprisoned till 1838. He was concerned in the movement of 1847, and was sent back to prison, from which he was freed by the revolution in Sicily 1848. Into the work for producing the new constitution of 1848, Feb. 10, he threw himself with fervor; and was offered high official positions, which he declined.

1849, July 18, a conspiracy of the govt. for his ruin was set at work through a letter forged by the police, and purporting to come from Marquis Dragonnetti. This letter referred to an invasion planned by Garibaldi, instigated by Mazzini and by Lord Palmerston of England. When this letter was proved a forgery, and when other accusations fell to the ground, some revolutionists were influenced by the govt., under threat of death, to accuse P. of complicity in their plans; and after a mockery of trial he was condemned to 24 years in irons and a heavy fine. Thus this man of rare genius and exemplary life was cast into the hulks at Nisida, dressed as a felon, and dragging 15 lbs. of chains with assassins and thieves as companions. To humble him, it was proposed to him to try the effect of a petition for his liberty: he indignantly spurned the proposal. At last the protests of the English and French diplomatists and the letters of Gladstone, with the dread of a popular rising, brought Ferdinand II. to a resolve to rid himself of his political prisoners by sending them to America, 1859. P. and 66 others were put on board an Amer. vessel, whose capt., however, was induced to land them at Cork, whence they returned, by London, to Turin. In the following year P. was elected deputy by two colleges in Tuscany, and took his seat in parliament. When Garibaldi (q.v.) had driven out the Bourbon dynasty, P. returned to Naples. He declined the ministerial office offered him by Cavour, also the governorship of the southern provinces, but accepted the office of privy councilor.

PO'ETRY: according to the mere etymology of the word, a creation or production of any kind; but its classical equivalent, *poiēsis*, was applied by the Greeks almost exclusively to the artistic productions of the imagination, expressed in language. Poetry is thus not necessarily associated with verse or rhyme. It may find expression in prose, and has often done so in ancient and modern times. The Book of Ruth, e.g., is decidedly poetical in substance, yet in form it is strictly prosaic. Similar is the case with the Book of Job and the Prophetical Writings, in the English version. Jeremy Taylor, Hooker, Rousseau, Burke, Carlyle, Ruskin, Hawthorne, Emerson, and other modern prose writers, are often as richly or profoundly imaginative as poets by profession; but though the essence of poetry lies rather in the nature and adornment of the thoughts expressed than in the form of the composition, yet in general it has subjected itself to certain rules of *metre* or measure, often also to rules of *rhyme*. The reason of this practice lies in the fact that the music so produced by the mere words is found to heighten the emotions which their meaning is calculated to produce. Hence P. has become almost synonymous with metrical composition. Poetical compositions are of several classes, to which particular terms are applicable: the principal are the Epic (q.v.), the Lyric (q.v.), and the Drama (q.v.). To the Epic belongs the Ballad (q.v.): to the Lyric belongs the Song (q.v.) in all its varieties, serious and comic, the Hymn (q.v.), Ode (q.v.), Anthem (q.v.), Elegy (q.v.), Sonnet (q.v.), etc.: to the Drama belong Tragedy and Comedy. Besides these three principal kinds, are others of less consequence, e.g., Didactic Poetry (q.v.), Satirical Poetry (see SATIRE), in which, however, imaginative and ideal elements in general mingle so sparingly that strict critics exclude it from the circle of poetry. The theory of P., or Poetics (a branch of Æsthetics, q.v.), has been largely discussed in every cultivated language. Histories of the P. of the several nations are numerous: Rosenkranz and Zimmermann have produced universal histories of poetry.

POGGE, *pŏg* (*Aspidophorus Europæus*): fish of family *Sclerogenidæ*, or *Mailed Cheeks*, and nearly allied to the Bullhead (q.v.), but having the body cuirassed with large bony scales from the head to the tail fin, so that it is in form nearly a pyramid with eight faces. Its length seldom exceeds 6 inches. The head is thicker than the body, with points and depressions, the snout furnished with short recurved spines. The P. is known on the coasts of England as the *Armed Bullhead;* and on the coasts of Scotland by the names *Lyrie, Pluck*, and *Noble.* Notwithstanding its uncouth appearance, its flesh is good.

POGGENDORFF, *pŏg'gėn-dorf*, JOHANN-CHRISTIAN: German physicist: 1796, Dec.29—1877, Jan.24; b. Hamburg. He studied pharmacy, chemistry, and physics; and was prof. of physics at Berlin from 1834 till his death. In 1838 he became a member of the Acad. of Sciences. His chief discoveries were in connection with electricity and galvanism, and these are reckoned of great value; he also invented a multiplying galvanometer for measuring the calorific action of currents. From 1824 onward he edited the *Annalen der Physik und Chimie,* contributing to this collection many important memoirs. He was one of the triad (Liebig and Wöhler being the other two) who prepared the *Dictionnaire de Chimie* (Brunswick 1837–51). The two works published by himself are the *Linien zu einer Geschichte der exacten Wissenschaften* (Berlin 1853), and *Biographisch-litterarisches Wörterbuch zur Geschichte der exacten Wissenschaften* (Leip. 1858–63, 2 vols.)—invaluable as a collection of facts concerning the lives and work of scientific men of all lands and times, a basis indeed for the history of physical science.—As a physicist, P. was lacking in mathematical ability, and was not distinguished for power in scientific generalization; but in experiment he was most able and thorough, and in invention of scientific apparatus, he had great ingenuity. His manners were unusually engaging.

POGON, n. *pō'gŏn* [Gr. *pōgōn,* the beard]: in *bot.,* the beard.

POGONIAS, *pō-gō'nĭ-ăs:* genus of acanthopterous fishes, of family *Sciænidæ*, having two dorsal fins, one of them deeply notched, and many small barbels under the mouth. The fishes of this genus are found on the coast of warm countries; and are remarkable for emitting sounds somewhat resembling those of a drum, which have obtained for them the name DRUMFISH. The production of the sounds appears to depend on action of the air-bladder. Sailors in vessels anchored near the shore, where species of this genus abound, are often prevented from sleeping, until they have become habituated to them. Some of the species attain large size, weighing 100 lbs. or more. The N. Amer. species is *P. chromis*, attaining 80 lbs., most abundant on the s. Atlantic and Gulf coast, though taken as far north as Cape Cod; it is at times very destructive to oyster beds. The young are different in color, being banded with brown and white, and until recently were mistaken for a distinct species, and named *P. fasciatus.* The Fresh-water Drum, Croaker, or Sheepshead, of the Great Lakes and w. rivers, is of another genus.

POH! int. *pō:* an exclamation of contempt.

POIGNANT, a. *poy'nănt* [F. *poignant*, poignant—from F. *poindre*, to pierce or sting: L. *pungĕrĕ*, to puncture, to pierce into]: very painful or acute, as pain or anguish; severe; piercing; keen; irritating; pungent; sharp; satirical. POIGN'ANTLY, ad. *-lĭ.* POIGNANCY, n. *poy'năn-sĭ*, the state of being poignant.

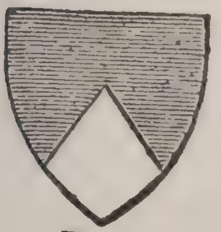
POINDEXTER, *poyn'dĕks-tėr*, GEORGE: 1779–1853, Sep. 5; b. Louisa co., Va.: statesman. He began the practice of law in Milton, Va.; removed to Miss. 1802; was atty.gen. of that territory 1803, and as such appeared for the prosecution when Aaron Burr was arrested in his first descent on New Orleans. He was a member of the territorial assembly 1805, delegate to congress 1807–13, U. S. judge of the Miss. district 1813. He was volunteer aid to Gen. Jackson in the battle of New Orleans. When Miss. became a state, he was its first representative in congress; there he was a zealous defender of Gen. Jackson. While in congress he revised the laws of Miss., and the code was pub. 1824. He returned to his law practice 1821, but 1830 was elected U. S. senator, and served till 1835. From being friends Pres. Jackson and P. became bitter enemies, and P. was even charged with complicity in an attack on the life of the pres. His public career ended 1835.

POINDING, n. *poyn'dĭng* or *pĭn'dĭng* [AS. *pyndan*, to shut up; *pund*, an inclosure: Ger. *pfänden*, to seize, to distrain]: in *Scotch law*, a process by which the property of the debtor's movables is transferred to the creditor: in *England*, the equivalent term is *distraining* or *distress.* POIND, v. *pĭnd*, to seize under legal process for debt; to distrain.

POINSETT, *poyn'sĕt*, JOEL ROBERTS: 1779, March 2—1851, Dec. 12; b. Charleston, S. C.: statesman. He was liberally educated, studied medicine in Edinburgh and milit. science at Woolwich. Afterward he travelled through Europe, and on his return home was sent to S. America to observe the struggle of the Spanish colonies for independence. While P. was in Chili, the Spanish authorities in Peru, on a rumor of war between the United States and Spain, seized several American ships; P. headed a force of Chilians, attacked the Spaniards, and recaptured the ships. On his return home he was elected to the legislature of S. C.; served in congress 1821–25; and was U. S. minister to Mexico 1825–29. He was the leader of the Union party in S. C. in opposing nullification; afterward was sec. of war in Van Buren's administration—his last public office. P. earnestly opposed the Mexican war.

POINT, n. *poynt* [F. *point*, a point, a dot; L. *punctum*, a small hole, a puncture—from *pungĕrĕ*, to prick]: the sharp end of any instrument or body; anything resembling a point; the sting of an epigram; a small cape or headland; a turn of thought or expression that strikes with agreeable surprise; in *geom.*, that which has position but no magnitude; a moment; a small space; punctilio; nicety; place or time near; critical moment; eve or verge, as of death; position; state; dot, mark, or spot; direction of view, or part viewed; particular mark or aim; particular mode or parts; instance; example; single part; part of a whole; single position; the main question; lace wrought with the needle. as point-lace; a division of the mariner's compass; in *OE.*, note; time; a tagged lace, used in dress: V. to bring to a sharp end; to direct toward; to aim; to show distinctly; to show by way of example; to mark with characters in order to indicate certain distinctions; to distinguish by stops or points by way of punctuation; to fill the joints with mortar and smooth them with a trowel, as a stone wall; to direct attention to an object by the finger; to indicate, as dogs do to sportsmen. POINT'ING, imp.: N. punctuation; the act or operation of filling the crevices of walls with mortar; the materials so employed. POINT'ED, pp. aimed at any particular person or thing: ADJ. having a sharp end; keen; smart, as a rebuke; in *arch.*, having arches sharply pointed. POINT'EDLY, ad. *-lĭ*, in a marked or particular manner. POINT'EDNESS, n. *-nĕs*, the state of being pointed; sharpness; keenness. POINT'ER, n. *-ėr*, anything that points; hand of a timepiece: variety of sporting-dog employed to point out the game (see below). POINT'LESS, a. *-lĕs*, without any sharpness at the termination, or keenness; aimless. POINT'ERS, n. plu. *-ėrz*, the two bright stars of the Great Bear which serve to point out the pole-star, a line drawn through them and prolonged nearly indicating it. POINTS, among *seamen*, flat pieces of plaited cordage tapering toward each end, used in reefing; on a *railway* (British usage), the switches or movable guiding-rails which admit a train on to a junction-line, to a siding, or from the one line of rail to the other; qualities, as good points. Pointsman, n. *poynts'măn*, on a *railway* (British), a workman who has charge of the switches or movable guiding-rails at or near a junction or station, to open or shut them on the approach of trains, as may be required. Point-work, work done with a needle or small-pointed instrument. Point of sight, in *perspective*, the point which is supposed to be exactly opposite the eye. Points of the compass, the points of the circumference of the compass card, which is divided into 32 equal parts or points—the circumference being 360 degrees, each point will be 11° 15′. Cardinal points, north, south, east, and west. Point d'appui, *p'wâng-dăp'û-ē* [F. *point*, point; *de*, of; *appui*, prop or support]: in *mil.*, point of support; base of operations. Point device, or devise (often preceded by *at*), *poynt dĕ-vīs'* or *p'wâng'dĕ-vēz'* [OF. *à point devis*, in the best way imaginable—from *deviser*, to distribute, regulate: L. *dividĕrĕ*, to divide]: particular sort of lace worked with a point or needle; condition of ideal excellence: term denoting anything uncommonly nice and exact. Point of incidence, the point on the surface of a body on which a ray of light falls. Point of reflection, the point from which a ray is reflected. Point-blank, a. in *mil.*, direct,—applied to the position of a gun or rifle aimed at an object without any elevation—the distance, which is more or less short, is called *point-blank range* (see Gunnery): Ad. directly. Point of a horse, in *mining*, the spot where the vein is divided into one or more branches. Vanishing-point, in *perspective*, the spot to which all parallel lines in the same plane tend in the representation. Point of contact, in *geom.*, the point in which a straight line touches a circle or curve. Points of a horse, those properties of shape, symmetry, etc., upon which much of the value of a horse depends. Point of view, aspect; mode of looking at. To point out, to show, as by the finger. To point at, to treat with scorn by directing attention to, as with the finger. At point, or On the point, as near as can be; on the verge. In good point, in good condition. To stand on points, to hesitate as to the propriety or delicacy of an act. Nine points of the law, the greater chance of success in a suit at law, as possession is *nine points of the law*. To make or gain a point, to accomplish a certain part of that which was proposed; to make advance by a step. To mark or score a point, in *billiards* and in *common usage*, to accomplish or note down successful hits, etc. To strain or stretch a point, to go beyond the proper limit; to exceed the bounds of strict propriety, or of duty—probably alluding to the points or tagged laces of olden costumes. Vowel-points, in certain eastern languages, as the Hebrew, a system of marks placed above or below the consonants to indicate vocal sounds and their character.—Syn. of 'point, n.': end; headland; promontory; part; moment; space; punctilio; nicety; degree; state; stop; spot; particular; aim; instance; condition.

POINT, *poynt,* in Heraldry: triangular figure issuing from the dexter and sinister base of the shield. A shield charged with a point is in heraldic drawing hardly distinguishable from one parted per chevron.


Point.

POINT-À-PITRE, *pwâng-tâ-pēt'r:* town of the French W. India island Guadeloupe, cap. of the division of Grande-Terre, on the Little Cul-de-Sac, 20 m. n.e. of Basse-Terre. The town is well built, and has a safe and spacious harbor. It is the centre of the commerce of the colony. Pop. (1901) 18,942.

POINT DE GALLE, *pwâng dė găl':* fortified town and seaport on the s.w. extremity of the island of Ceylon, on a low, rocky promontory of the same name; lat. 6° 1′ n., long. 80° 12′ e. The harbor, a small bay with entrance about a mile in width, is good, though there are numerous rocks, and a pilot is required to conduct vessels to the anchorage. Among principal edifices are the fort—a mile in circumference—the old Dutch church, a Rom. Cath. chapel, an excellent orphan asylum, barracks, and light-house 103 ft. above sea-level. This town has become important in recent years, especially since the organization of the Peninsular and Oriental Steam-navigation Company. Vessels plying between Suez and Bombay and Calcutta, Australia, China, Penang, and Singapore, call here to coal and to tranship passengers. It is the seat of govt. of the s. province of the colony of Ceylon. Gold and silver ornaments, work boxes, etc., are made with great taste and nicety by the native workmen. Pop. (1891) 33,505; (1901) 37,316.

POINTED ARCHITECTURE: see GOTHIC ARCHITECTURE.

POINTE LEVI: see LÉVIS.

POINT'ER: kind of dog nearly allied to the true hounds (q.v.), but not reckoned one of them; remarkable for its habit of *pointing* at game; its whole body, particularly its head, indicating the position of the game to the sportsman. A well-trained P. will remain long immovable in the attitude of pointing, not going forward to disturb the game which its exquisite power of scent has enabled it to discover. It is recorded of two British pointers that they stood an hour and a quarter without moving, while Gilpin painted them in the act. The P., when he scents game, stops so suddenly and completely, that even the fore-foot, already lifted, remains suspended in the air. Without the P., the sportsman would have comparatively little success in pursuit of grouse; but the dog performs for him the laborious task of 'beating' the wide moors. Well-trained pointers will scarcely point at anything except 'game'; but inferior dogs often point at almost any living creature the odor of which affects their nostrils. The habit of pointing once acquired appears to become hereditary, so that very young pointers often exhibit it in great perfection. It has been explained, with the crouching of the setter, as 'the natural start of surprise or interest which all dogs give when coming suddenly upon the scent or sight of their natural prey; modified by cultivation, and by transmission through many generations, each, by education, improving upon the capabilities of the former.'—See Bell's *British Quadrupeds*.

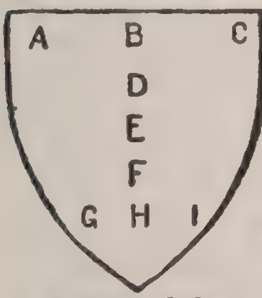
The breed of pointers now most common in Britain is believed to be crossed with the foxhound, to which there is considerable resemblance in colors as well as in form. The figure is very muscular, the hair short, the ears pendulous, the upper lips moderately large, the tail pointed and destitute of brush. Dogs of this breed are very active, and capable of long-sustained exertion. The original breed, the *Spanish P*, probably brought to Spain from the East, is of more bulky form, less active habit, and less capability of continued exertion. The P. is very forward and familiar in its manners, but is both affectionate and intelligent, though it is reputed inferior in these respects to many other kinds of dogs.

A Pointer standing at Game.

POINT PLEAS'ANT, BATTLE OF: fierce contest of about 1,100 militia of s.w. Va., under Gen. Andrew Lewis, with a large force of Shawnee, Delaware, and Mingo Indians, under the Shawnee chief, Cornstalk, 1774, Oct. 10, at a point near the junction of the Great Kanawha with the Ohio, now Point Pleasant, W. Va. The Scotch earl of Dunmore, acting as gov. of Va., had called out the militia of the s.w. part of Va., for defense of the frontier toward the Ohio, where both backwoodsmen and Indians were drifting into bloody war. Under such leaders as Isaac and Evan Shelby, Daniel Morgan, George Matthews, William Campbell, Andrew Moore, John Robertson, Valentine Sevier, Thomas Fleming, and Charles Lewis, with Andrew Lewis in command, a force was gathered at Camp Union, now Lewisburg, W. Va., and proceeded over the mountains to the Kanawha, whence, with a reinforcement, they descended that river in canoes, and encamped, Oct. 6, on the point at its mouth near the Ohio. Dunmore had gone to the Ohio with about 1,000 men, at Wheeling (W. Va.), ostensibly for co-operation with the troops from s.w. Va.

under Gen. Lewis, but actually more disposed to let those patriots and the savages slaughter each other, and clear the ground where he wished at once to secure wild lands and assert British against colonial authority. The Revolution was already practically begun, an act of the Brit. parliament had carried the bounds of Canada to the Ohio and Mississippi rivers; and Dunmore was particularly disposed to thwart the colony, and at the same time get access to the rich lands beyond the frontier. No message from him reached Gen. Lewis; and appearances tend to convict the earl of securing by his agents the concentration of the Indians against Lewis, while he delayed, and finally sent orders for Lewis to meet him 80 m. beyond the Ohio, on the banks of the Scioto. The victory, after one of the most hotly contested battles ever fought with Indians, was a disappointment to Dunmore and a triumph to the provincial army; and this darkly planned and desperately fought battle has been noted in that region as the first of the Revolution. The battle raged nearly all day, and would have ended as that of Braddock did, had not the backwoods experience and the skill and courage of the whites fully matched that of the savages. Cols. Charles Lewis, Fleming, and Field successively fell at the head of the main body, and nearly a fifth of the little army were either killed or wounded before the success of three companies, in an attack on Cornstalk's rear, decided the fortunes of the day, with greater loss to the savages than to the whites.

POINTS OF THE ESCUTCHEON, in Heraldry: divisions of the shield. In order to facilitate the description of a coat-of-arms, it is the practice to suppose the shield to be divided into nine points, which are known by the following names: A, the dexter chief point; B, the middle chief; C, the sinister chief; D, the collar or honor point; E, the fess point; F, the nombril, or navel point; G, the dexter base point; H, the middle base point; and I, the sinister base point. The dexter and sinister sides of the shield are so called, not in relation to the eye of the spectator, but from the right and left sides of the supposed bearer of the shield.



Points of the Escutcheon.

POISE, n. *poyz* [OF. *poiser; peser*, to weigh—from *poids*, weight: L. *pensārĕ, pendĕrĕ*, to weigh, weigh out]: a regulating power or weight; the weight used with steelyards; gravity; balance; that which balances: V, to make of equal weight; to balance; to load with a weight for balancing; to examine or ascertain, as by a balance. **Pois'ing**, imp. **Poised**, pp. *poyzd*.

POISON, n. *poy'zn* [F. *poison*, poison: L. *potĭo* or *potĭōnem*, a drink—from *poto*, I drink: Sp *ponzoña*, a venom, poison]: any substance which, when swallowed, inhaled, or rubbed over the skin, injures the health or destroys life (see Poisons): venom; anything which taints moral purity: V. to injure the health, or cause death, by administering poison; to infect with poison; to taint; to mar; to corrupt, as one's morals. Poi'soning, imp.: N. the act of giving poison to, or of injuring or killing by poison (see Poisoning, Secret). Poisoned, pp. *poy'znd:* Adj. infected or destroyed by poison. Poi'soner, n. *-zn-ėr*, one who poisons or corrupts. Poi'sonous, a. *-zn-ŭs*, containing poison; injurious to health; deadly; corrupting morals or purity. Poi'sonously, ad. *-lĭ*. Poi'sonousness, n. *-nĕs*, the quality of being fatal to life or injurious to health.—Syn. of 'poison, n.': venom; pest; bane; malignity; ruin.

POI'SONING, Secret: mode of taking away life by poisons so slow in operation that the gradual sinking of the victims under their influence closely resembled the effects of disease or the ordinary decay of nature. It has been practiced in all ages, and several undoubted and numerous supposed instances of it are mentioned by Greek and Roman writers. In the 17th c. this atrocious practice became frequent, and rapidly increasing, spread over w. Europe like an epidemic, and became gradually a regular branch of education among those who professed a knowledge of chemistry, magic, or astrology. These persons regarded the knowledge of the mode of preparing secret poisons as of the highest importance, and many of them realized large sums by the sale of their preparations, and occasionally of the secret of their composition. Chiefly in Italy and France this art was practiced and perfected; but it seems to have had some prevalence in England also, for we find that in the 21st year of Henry VIII.'s reign, an act was passed declaring the employment of secret poisons to be high treason, and sentencing those found guilty of it to be boiled to death. The only undoubted instance of this crime prominent in English history is the murder of Sir Thomas Overbury (q.v.) by Viscount Rochester (favorite minion of James VI.) and his wife, the divorced Countess of Essex; though many suppose, and with some probability, that James VI. himself was a victim to similar nefarious practices on the part of Villiers, Duke of Buckingham; and undoubtedly such was the popular impression at the time, for Dr. Lamb, a conjuror and quack, who was believed to have furnished Buckingham with the poisons, was seized by the angry populace in Wood Street, Cheapside, London, and beaten and stoned to death. In Italy this mode of poisoning seems from the writings of various authors to have been deemed justifiable for riddance of a rival or enemy; and from the time of the Lombard invasion to the 17th c., Italian history teems with instances showing that poison was both the favorite weapon of the oppressor, and the protection or revenge of the oppressed. The Borgias are generally singled out as poisoners, and held up to the horror and detestation of mankind; though as far as this method of destroying their adversaries was concerned, they merely employed it a little more frequently than their neighbors. The popular feeling on this subject is instanced in the case mentioned in the memoirs of Henry II., fifth Duke of Guise, of a soldier who was requested to rid that duke of one of his opponents in Naples, Gennaro Annese. *Assassination* was the mode proposed to the soldier, but he shrank with horror from the suggestion, while stating that he was quite willing to *poison* Annese. It was shortly after the date of this story (1648) that secret poisoning became so frequent; and the Rom. Cath. clergy, despite the rules of the confessional, felt themselves bound to acquaint Pope Alexander VII. with the extent of the practice. On investigation, it was found that young widows were extraordinarily abundant in Rome, and that most of the unhappy marriages were speedily dissolved by the sickness and death of the husband; and further inquiries resulted in the discovery of a secret society of young matrons, which met at the house of an old hag, Hieronyma Spara, a reputed witch and fortune-teller, who supplied those of them who wished to resent the infidelities of their husbands, with a slow poison, clear, tasteless, and limpid, and of strength sufficient to destroy life in the course of a day, week, month, or a number of months, as the purchaser preferred. The ladies of Rome had been long acquainted with the 'wonderful elixir' compounded by La Spara; but they kept the secret so well, and made such effectual use of their knowledge, that it was only after several years, during which a large number of unsuspected victims had perished, and even then only through a cunning artifice of the police, that the proceedings were brought to light. La Spara and 13 of her companions were hanged, a large number of the culprits were whipped half-naked through the streets of Rome, and some of the highest rank suffered fines and banishment. About half a century afterward, the discovery was made of a similar organization at Naples, headed by an old woman of 70 years, named Toffania, who manufactured a poison similar to that of La Spara, and sold it extensively in Naples under the name of *acquetta*, and even sent it to all parts of Italy, under the name of 'Manna of St Nicola of Bari,' giving it the same name as the renowned miraculous oil of St. Nicola, to elude discovery. This poison, now best known as the 'Acqua Tofana' or 'Acqua di Perugia,' is said by Hahnemann to have been compounded of arsenical neutral salts; while Gareli states that it was crystallized arsenic dissolved in a large quantity of water; but both agree that it produced its effect almost imperceptibly, by gradually weakening the appetite and respiratory organs. After having directly or indirectly caused the death of more than 600 persons, Toffania was at length seized, tried, and strangled 1719. From this time the mania for secret poisoning gradually died away in Italy.

About the middle of the 17th c. this horrible practice seems to have become prevalent in France, and under similar circumstances, the agents being married women, and their husbands the victims; and as in Italy, the extent to which the practice was carried was made known first by the clergy. The government, acting on the information thus obtained, seized and imprisoned in the Bastille two Italians, Exili and Glaser, suspected of having been the manufacturers and vendors of the poisons. Glaser died in prison; but Exili, becoming acquainted with another prisoner named St. Croix, communicated to him his secret, which the latter made considerable use of after his release, compounding in particular the poison known as 'succession powder,' which subsequently became so celebrated. It was the same St. Croix who was prominent in the tragical history of the Marquise de Brinvilliers (q.v.). Penautier, treasurer of the province of Languedoc, and the Cardinal de Bonzy were pupils of St. Croix, and managed, the one to pave the way for his own advancement, and the other to rid himself of his numerous creditors, by poison; but the great influence of these men, and the want of direct evidence, barred all proceedings against them. Secret poisoning became fashionable; the passions of jealousy, revenge, avarice, and even petty spite, all were satisfied in the same way, and as a natural consequence other offenses decreased in proportion. The prisons teemed with suspected criminals, and the 'Chambre Ardente' was instituted for the special purpose of trying these offenders. In Paris this trade was in the hands chiefly of two women, Lavoisin and Lavigoreux, who combined with the ostensible occupation of midwife that of fortune-teller, and foretold to wives the decease of their husbands, to needy heirs that of their rich relatives, taking care at the same time to be instrumental in fulfilling their own predictions. Their houses were frequented by numbers of all classes, both from Paris and the provinces, among whom were the celebrated Marshal de Luxembourg (q.v.), the Duchess de Bouillon, and the Countess de Soissons; the two former of these, however, went merely from curiosity. Lavoisin and her confederate were at last discovered, tried, condemned, and burned alive in the Place de Grève 1680, Feb. 22; and 30 to 50 of their accomplices were hanged in various cities of France. So common had this atrocious practice been, that Madame de Sévigné, in one of her letters, expresses a fear lest the term 'Frenchman' and 'poisoner' should become synonymous. For two years after the burning of the two Parisian prisoners, the crime continued to be largely committed, being fostered by the impunity with which offenders of high rank were allowed to escape; and it was not till more than 100 persons had died at the stake or on the gallows, that the government succeeded in suppressing it. The mania for secret poisoning has not since been revived, though isolated instances have occasionally been discovered. See Beckmann's *History of Inventions*, the historians of the period of James I.'s reign, the French *Causes Celebres*, and Mackay's *Popular Delusions*.

POISONS: For convenience of reference in sudden emergencies a table is here given of the principal P., the symptoms they produce, and readily procurable household means of counteracting them. Treatment of the subject follows tables.

POISONS.

POISONS.	SYMPTOMS.	ANTIDOTES AND REMEDIES.
IRRITANTS. *a.* METALLIC. *Antimony.* Tartar emetic, Butter of A., Oxide of A., Sulphide of A.	Great burning in pit of stomach, nausea, vomiting, diarrhœa, fainting, skin cold, pulse rapid and small, clammy perspiration.	In the nausea promote vomiting by tickling the throat internally with a feather and giving draughts of lukewarm water. Administer astringents, as decoction of oakbark or strong green tea.
Arsenic. White A., Fowler's solution, Cheele's green, Paris green, Orpiment, etc.	Usually in 30 min. faintness, nausea, burning in throat and stomach, retching, vomiting of dark greenish or yellow matter with blood streaks; great thirst, cramps in legs; rapid, small pulse.	Administer sweet oil or melted butter, and milk; produce vomiting with an emetic; frequent draughts of magnesia or of powdered chalk, and water; mucilaginous drinks, as slippery elm decoction.
Bismuth. Pearl white, Iodide of B., Nitrate of B.,	Burning in throat, vomiting, diarrhœa, metallic taste, hiccup.	Empty the stomach with emetics or lukewarm water, then great draughts of mucilaginous liquids and milk; purgatives.
Chromium. Potassium bichromate, Chrome yellow.	Vomiting, diarrhœa, paralysis.	Emetics; then magnesia or powdered chalk, in water.
Copper. Verdigris, Blue vitriol, Carbonate of C.	Retching, coppery taste, vomiting of blood-streaked greenish matter; headache, colic, spasms, convulsions.	Promote vomiting with lukewarm water draughts, alternating with mucilaginous liquids, milk, white of egg. Strong coffee serves as an antidote.
Gold. Terchloride.	Nausea, vomiting, burning in stomach, faintness, cramps, excessive thirst.	Emetics; magnesia or powdered chalk, in water; mucilaginous drinks and purgatives.
Iron. Copperas, or green vitriol.	Vomiting, purging, colic, tension in pit of stomach.	Magnesia or carbonate of soda, or powdered chalk, in water.
Lead. Sugar of L., White L., Red L., Litharge.	Burning in throat, great thirst, vomiting, distress in pit of stomach, severe colic pains, tension of abdomen, vertigo, convulsions.	Epsom or Glaubers salts, *not* magnesia nor chalk; purified animal charcoal, albuminous liquids, white of egg, milk.
Mercury. Corrosive sublimate, Vermilion, Mercurial ointment, White precipitate, Red precipitate.	Immediately, constriction and burning in throat, metallic taste, great pain in stomach and abdomen, vomit of mucus and blood, small, rapid pulse, cold skin, labored respiration.	Emetics or lukewarm water; magnesia or chalk, in water with common salt; after evacuation of stomach, mucilaginous drinks.
Tin. Putty powder. Tin-liquor, Muriate of T.	Strong metallic taste, nausea, vomiting, diarrhœa, colic.	Milk in large quantities, then carbonate of soda, or magnesia, or powdered chalk, in water.
b. NON-METALLIC. *Acids.* Sulphuric, Nitric, Hydrochloric (muriatic), Citric, Tartaric, Oxalic, Carbolic, etc.	Almost immediately, burning in throat, extending to stomach; colic, retching, vomiting dark brown mucus mixed with blood; difficult respiration, great thirst, constant ineffectual effort to micturate.	Produce vomiting by tickling throat internally; copious draughts of magnesia (or chalk), in water.

POISONS.

POISONS.	SYMPTOMS.	ANTIDOTES AND REMEDIES.
Alkalies. Lye, Potash, Soda, Ammonia. Their salts: Tartrates, Nitrates, Iodides, Chlorides, etc.	Burning in throat, reaching to stomach; vomiting brown matter, blood-streaked; diarrhœa, colic.	Vegetable acids, as lemon-juice, or cider or wine-vinegar; white of egg, milk, barley-water, olive oil, to aid vomiting and neutralize the poison.
c. METALLOIDS. Iodine, Phosphorus, Bromine, Chlorine.	Nausea, vomiting, burning in stomach, colic, diarrhœa.	Free employment of emetics and purgatives; mucilaginous drinks holding magnesia.
d. VEGETABLE IRRITANTS. Creasote, Oil of tar, Oil of turpentine, Ergot of rye, Aloes, Squirting cucumber, Decaying vegetable matter, etc.	Severe abdominal pain; sometimes excessive purging and convulsions.	Emetics, purgatives, cathartic injections, fomentation of the abdomen.
e. ANIMAL IRRITANTS. Cantharides, Decaying animal matters, as cheese, sausages, shellfish. Virus of serpents, spiders, etc.	Nausea, vomiting, colic, etc. In the case of bites or stings inflammation at the point of injury.	When the poison enters through the digestive system, administer sweet oil, milk, and mucilaginous liquids copiously. For bites and stings apply a moderately tight ligature above the seat of injury, wash wound with warm water, promote flow of blood. The patient should be put to bed and well covered.
NARCOTICS. Opium (morphine), Chloral, Chloroform, Ether, Prussic acid, Gelsemium, Hyoscyamus, etc	Headache, vertigo, insensibility, coma.	Prompt evacuation of stomach by emetics or stomach pump; strong tea or coffee; pouring cold water on chest and spine. Incite the patient to muscular action by supporting on both sides and compelling him to walk. In Prussic acid poisoning the only recourse is to affusions of cold water on the spine.
NARCOTICO-IRRITANTS. Nux vomica, (strychnine), Certain fungi (toadstools), Belladonna, White hellebore, Aconite, Digitalis, Tobacco, etc.	Various, but usually there is vomiting, diarrhœa, stupor, paralysis.	Emetics or evacuation by stomach pump. Laxative injections if the intestines seem to be involved.
GASES. Carbonic acid, Coal gas, Natural gas, Sulphuretted hydrogen, etc.	Giddiness, nausea, insensibility, tendency to sleep, great prostration. Respiration first stertorous, then suspended; heart action intermittent.	Promote respiration artificially (see RESPIRATION). If the skin is warm pour cold water on head and spine; if the skin is cold employ a warm bath.

POI'SONS: commonly defined as substances, which, administered in small quantity, are capable of acting deleteriously on the body; but this definition is too restricted, for it excludes numerous substances which are poisonous only when administered in large doses, e.g., nitre, and the salts of lead, antimony, etc. A person may be poisoned as effectually by an ounce of nitre as by five grains of arsenic. The suggested definition: 'A poison is a substance which, when taken internally, is capable of destroying life without acting medicinally on the system,' is not perfect, for it does not include P. that act by absorption when applied to a thin and delicate membrane, e.g., glanders, syphilitic poison, etc., or those which must be introduced directly into the circulation by a puncture or abraded surface, as the venom of insects, scorpions, and serpents, the woorali poison (see CURARE), and that of animals suffering from hydrophobia. Omitting, for the present, the cases not included in the above proposed definition, we may consider P. as divisible into three classes, according to their mode of action on the system—*Irritants, Narcotics*, and *Narcotico-Irritants.*

The *Irritants* in ordinary doses speedily occasion intense vomiting and purging, and severe abdominal pain. They act chiefly on the stomach and intestines, which they irritate, inflame, and frequently corrode, and may thus occasion ulceration, perforation, or gangrene. Among those which possess corrosive properties are the strong mineral acids, caustic alkalies, corrosive sublimate, etc.; while among the pure irritants which exert no destructive chemical action on the tissues with which they come in contact, are arsenic, cantharides, carbonate of lead, etc. The *Narcotics* act specially on the brain and spinal cord. Among their most common symptoms are giddiness, headache, obscurity of sight or double vision, stupor, loss of power of the voluntary muscles, convulsions, and, finally, complete coma. Moreover, many of the narcotic P. present special symptoms, in some cases strongly resembling pure special diseases. Thus there is almost exact similarity in the symptoms of poisoning by opium and of apoplexy, while prussic acid and some other P. give rise to symptoms closely resembling those of epilepsy. These P. have no acrid, burning taste, nor do they usually give rise to vomiting or diarrhea; and, except a slight fulness of the cerebral vessels, they leave no well-marked post-mortem appearance. They are few in number, and none of them belong to the mineral kingdom. The *Narcotico-Irritants* have, as their name implies, a mixed action. 'At variable periods, after they have been swallowed, they give rise to vomiting and purging, like irritants, and sooner or later produce stupor, coma, paralysis, and convulsions, owing to their effect on the brain and spinal marrow. They possess the property, like irritants, of irritating and inflaming the alimentary canal. As familiar examples, we may point to nux vomica, monkshood, and poisonous mushrooms. . . . The fact of the symptoms occurring after a meal at which some suspicious vegetables may have been eaten, coupled with the nature of the symptoms themselves, will commonly indicate the class to which the poison belongs. Some narcotico-irritants have a hot, acrid taste, such as the aconite or monkshood; others an intensely bitter taste, as nux vomica and its alkaloid strychnia.'

For a notice of the most important rules for the physician in all cases of suspected poisoning, see the standard works on poisoning or on medical jurisprudence.

Under *Irritant Poisons* may be included, (1) Mineral Acids, as sulphuric, nitric, and hydrochloric acids; vegetable acids, and other salts, as oxalic acid, binoxalate of potash, and tartaric acid (in doses of half an ounce or more); the alkalies, as pearl-ash (carbonate of potash), soap lees (carbonate of soda), ammonia and its sesquicarbonate; and metallic compounds, as white arsenic (arsenious acid); yellow arsenic (orpiment), corrosive sublimate, bicyanide of mercury, pernitrate and other salts of this metal, acetate of lead (sugar of lead) in doses of an ounce and upward, carbonate of lead (white lead), sulphate of copper (blue vitriol), subacetate of copper (verdigris), arsenite of copper (commonly known as *Scheele's green* or *emerald green*, and much used under the name *extract of spinach* for coloring confectionery), tartarized antimony, chloride of antimony (butter of antimony), chloride of zinc (Sir W. Burnett's Fluid), nitrate of silver (lunar caustic), sulphate of iron (copperas or green vitriol), and bichromate of potash. (2) Vegetable Substances, as colocynth and gamboge in large doses, savin, croton oil, leaves and flowers of the common elder (*Sambucus nigra*), etc. (3) Animal Substances, such as cantharides, to which must be added the occasional cases in which sausages, and certain fish and mollusks, usually quite innocuous, act as irritant poisons.

The *Narcotic Poisons* include opium, hydrocyanic (or prussic) acid, oil of bitter almonds, cyanide of potassium, henbane, especially the seeds, alcohol, ether, chloral, and chloroform; while *Narcotico-Irritant Poisons* are nux vomica, meadow saffron (*Colchicum*), white hellebore, foxglove, common hemlock, water hemlock (*Cicuta virosa*), hemlock water-dropwort (*Œnanthe crocata*), fool's parsley, thorn-apple, monkshood or wolf's bane, deadly nightshade, tobacco, Indian tobacco (*Lobelia inflata*), the bark and seeds of the common laburnum, the berries and leaves of the yew-tree, and certain kinds of fungi.

The cases in which there are antidotes qualified to neutralize chemically the action of the poison are few in number. For the *mineral acids* should be administered chalk or magnesia in water, with the view of neutralizing them, after which milk should be given freely. The *alkalies and their carbonates* must be neutralized by vinegar and water, or lemon-juice mixed with water, after which milk should be given. For *oxalic acid* the antidote is chalk or magnesia in water, by which an insoluble oxalate of lime or magnesia is formed. For *arsenic*, the hydrated peroxide of iron has been regarded as an antidote, but its efficacy is doubtful. Vomiting should be excited by administration of a scruple of sulphate of zinc in warm water, and after the stomach has been well cleared out, demulcent fluids, such as flour and water or milk should be given. *Corrosive sublimate* combines with albumen (white of egg), and forms an insoluble inert mass; *nitrate of silver* is neutralized by chloride of sodium (commonsalt) dissolved in water; *tartarized antimony* is to a great degree rendered inert by a decoction of bark or gall-nuts; and *acetate of lead* is rendered inert by sulphate of magnesia, which converts it into an insoluble sulphate of lead. In all cases of suspected poisoning, in which the nature of the poison is not known, the safest course is at once to produce vomiting by sulphate of zinc, or in its absence by a dessert-spoonful of flour of mustard suspended in tepid water, and to continue the vomiting till all the contents of the stomach are discharged, after which milk should be given freely.

Most of the known gases—except hydrogen, nitrogen, and oxygen—have a poisonous action when inhaled into the lungs; but in these cases death, if it ensues, is popularly said to be due to *suffocation*, though strictly speaking a person who dies from the effect of carbonic acid, or sulphuretted hydrogen, or of any other noxious gas, is in reality just as much poisoned as if he had taken oxalic acid or arsenic. *Carbonic Acid* (q.v.), though seldom employed as an instrument of murder, is often a cause of accidental death, and in France of self-destruction. It is established by numerous experiments that air containing more than *one-tenth* of its volume of carbonic acid, will, if inhaled, destroy life in man and the higher animals. In its pure state it cannot be inhaled, because its contact with the larynx causes spasmodic contraction of the glottis; but when diluted with two or more volumes of air, it can be breathed, and produces symptoms of vertigo and somnolency; and so great a loss of muscular power, that the individual, if in an erect or sitting position, falls as if struck to the ground. The respiration, at first difficult and stertorous, becomes suspended. The action of the heart is at first violent, but soon ceases, sensibility is lost, and the person falls into a comatose or death-like state. Those who have been resuscitated usually feel pain in the head and general soreness of the body for some days, and in a few severe cases paralysis of the muscles of the face has remained. As deaths frequently occur from coal or charcoal being employed as fuel in ill-ventilated rooms (often without any kind of chimney), it is expedient that every one should know what is to be done in such an emergency. The patient must be at once removed from the poisonous atmosphere, after which artificial respiration should be had recourse to. If the skin is warm, cold water may be poured on the head and spine; if the surface be cold, a warm bath should be employed. When respiration is re-established, venesection will often relieve the congestion of the vessels of the brain. Inhalation of oxygen gas is said to have been of service in these cases. *Carbonic oxide*, which exists largely in coal gas, is at least as active a poison as carbonic acid, and is doubtless the principal cause of the effects produced by the inhalation of diluted gas. Both carbonic acid and carbonic oxide act as powerful narcotic poisons. *Sulphuretted hydrogen,* abundant in foul drains, sewers, cesspools, etc., is a gaseous poison whose effects are often noticed. Nothing certain is known of the smallest proportion of this gas required to destroy human life; but air containing only one eight-hundredth of its volume of this gas will destroy a dog; and when the gas exists in the proportion of one two-hundred-and-fiftieth, it will kill a horse. A medical authority states that the men engaged in the construction of the Thames Tunnel in London suffered severely from this gas, derived probably from the action of the water on the iron pyrites in the clay, and which issued in sudden bursts from the walls. By respiring this atmosphere, the strongest and most robust men were in a few months reduced to extreme exhaustion, and several died. The first symptoms were giddiness, nausea, and general debility; the men became emaciated, and fell into low fever accompanied by delirium. In this case the dilution was extreme; when the gas is breathed in a more concentrated form, the person speedily falls, apparently lifeless. It appears to act as a narcotic poison, when concentrated; but like a narcotico-irritant, when much diluted with air.

The action of the vapor of *hydrosulphate of ammonia,* also commonly present in cesspools, etc., is probably much the same as that of sulphuretted hydrogen. The experiments of Dr. Herbert Barker show, however, that these matters do not produce similar symptoms on dogs (*On Malaria and Miasmata,* p. 212).

Many of the gases, found only as products of the laboratory, are in the highest degree poisonous, as arseniuretted hydrogen, cacodyl, etc.; but few persons run the risk of inspiring them.

We turn to consider the P. not included in the definition which, in lack of a better, we have adopted. The P. that may affect the body by direct introduction into the circulation, through a puncture or abrasion, may be derived from the mineral, the vegetable, or the animal kingdom; but, with a few exceptions (e.g., Woorali or Curare [q.v.] Poison), the P. derived from the mineral and vegetable kingdoms would act as efficiently if introduced into the stomach as if injected into the circulating blood; while the animal P. act only by direct introduction into the blood, and are inert when introduced into the stomach. Poisoned wounds derived from dissection of recently dead bodies, known as *dissecting wounds,* are occasionally attended with most alarming symptoms, and are liable to terminate fatally. In the case of Dr. Pett, quoted by Travers in his work *On Constitutional Irritation,* the symptoms on the third day were 'a haggard and depressed countenance; violent shiverings, followed by some degree of heat; extreme alteration in appearance; countenance suffused with redness; the eyes hollow and ferrety; some difficulty of breathing, which was sudden, irregular, and amounting almost to sighing; excessive torpor, and the whole aspect resembling one who had taken an overdose of opium: on the following day there was extreme exhaustion and feebleness, and death ensued on the fifth day.' For the symptoms produced by bites and stings of insects, arachnidans, and serpents, and for the treatment, see VENOMOUS BITES AND STINGS. For poisoned wounds from diseased animals, see GLANDERS: HYDROPHOBIA.

The sale of P. is regulated by law in most of the states of the Union, the law of N. Y. requiring apothecaries to keep a register of sales of certain P.; and in the case of other poisonous substances, to attach to each package containing them a label bearing in plain letters the word 'poison.' In Mass. the law concerning the sale of P. covers more than thirty substances: whoever sells any of these without a physician's prescription, must affix to the bottle, box, or wrapper a lable of red paper having in large letters the word 'poison;' also giving the antidote, if there be one.—Many of the states have laws inflicting severe penalties on poisoners. An indictment for murder by poisoning need not specially allege intent to kill. To constitute the crime of poisoning, it is not necessary that there should be a delivery of the poison by hand.

POISON ELDER—POISON IVY—POISON OAKS—POISON SUMACH—POISON VINE: see SUMACH.

POISSON, *pwâ-sōng'*, SIMEON-DENIS: French geometer: 1781, June 21—1840; b. Pithiviers, dept. of Loiret. He studied in the École Polytechnique; and his mathematical talent early attracted the notice of Lagrange and Laplace. In 1802 he became a prof. in the Polytechnique; 1808, a member of the Bureau des Longitudes; 1809, prof. of mechanics to the Faculty of Sciences; member of the Institute 1812, etc.; and in 1837 he was made a peer of France. He was characterized by simplicity, modesty, and affectionateness. P.'s whole life was given to scientific research; and among the results are 300 Memoirs, in the publications of the École Polytechnique, of the Acad. of Sciences, and in other scientific journals. A complete summary by P. himself is published by Arago (*Notices Biographiques*, II.). Of his separate treatises the following are chief: *Traité de Mécanique* (2 vols. 1833); *Nouvelle Théorie de l'Action Capillaire; Théorie Mathématique de la Chaleur* (1835); *Mémoire sur le Mouvement des Projectiles dans l'Air, en ayant égard à la Rotation de la Terre* (1839); and the famous work, *Sur l'Invariabilité des Moyens Mouvements des grands Axes Planétaires.* P. is considered one of the chief founders of the science of mathematical physics, which was brought by him to great perfection, especially as concerns statical electricity and magnetism.

POITIERS, *poy-tērz′*, F. *pwâ-te-ā′*, earlier *Poictiers* (corruption of the Latin *Pictavium*, so called by the Gallic tribe *Pictavi*, who inhabited the district in Cæsar's time); one of the oldest towns in France; capital of the dept. of Vienne, and formerly of the province of Poitou. Pop. (1901) 39,886. It occupies the summit and slopes of a little eminence, round the base of which flow the Clain and the Boivre, is encircled by walls and towers, and has a very full appearance. It is connected by railway with Tours, 63 m., and with Bordeaux. Before the Revolution P. had an immense number of churches, chapels, monasteries and nunneries; even yet these are numerous. The principal are the church of St. Jean (now a *Musée*), one of the oldest Christian monuments in France; and the cathedral of St. Pierre, one of the finest in France, belonging (in part) to the 12th c., and in which, or in the older edifice that occupied its site, 23 councils were held—the first in the 4th, the last in the 15th c. It contains the ashes of Richard Cœur-de-Lion Its university, founded by Charles VII., 1431, was abolished after 1789, but its place has been supplied by a university-academy with two faculties. P. possesses a public library of 25,000 vols. and MSS.; a museum; and several learned societies, including one for studying the antiquities of w. France. In and around P. are numerous Celtic and Roman remains. In 1882 the remains of a Gallo-Roman town were discovered here, with temple, baths, and streets, spread over about 14 acres. In the vicinity, Alaric II., the Visigoth, was defeated and slain by Clovis 507. Somewhere between P. and Tours a great battle took place 732 between Franks under Charles Martel (q.v.) and the Moors under Abd-ur-Rahmân. The Moors were routed with enormous slaughter—375,000 of them (according to one old exaggerating chronicler) being left dead on the field; later still (1356) at Maupertuis-le-Beauvois, about 5 m. n. of P., Edward the Black Prince, with 12,000 or 14,000 Englishmen and Gascons, defeated 60,000 of the troops of King Jean of France and took the king and one of his sons prisoners.

POITOU, *pwâ-tō′*: former province of w. France, now mainly comprised in the depts. Deux Sèvres, Vendée, and Vienne. It was divided into Upper and Lower P., and had for its cap. Poitiers (q.v.). P. became a possession of the English crown when Eleanor, Countess of P. and Duchess of Aquitaine, after her divorce from Louis VII. of France 1151, Sep., married, on Whitsunday following, Henry of Anjou, afterward Henry I. of England. Philippe-Auguste reconquered the province 1204, and 1295 it was formally ceded to France. By the peace of Bretigny 1360 it again reverted to England, but was soon retaken by Charles V., who gave it to his brother, the Duke of Berri. It was later incorporated with the French crown.

POITRINAL, *poy′trĭn-al*, or PECTORAL, *pĕk′tō-ral*, in Ancient Armor: the horse's breastplate, of metal plates riveted together, covering the breast and shoulders.

POKANO'KETS: family of N. American Indians, known also as Wampanoags; one of the five families of the Algonkin tribe that occupied Mass. at the time of the English settlement. Their chief, Massasoit (q.v.), signed a treaty with the settlers; and under his son, Metacomet, the P. led the uprising that began King Philip's Indian war. Nearly all the survivors of that war were sold as slaves in the W. Indies or otherwise scattered.

POKE, v. *pōk* [Gael. *puc*, to push: Dut. *poken*, to poke; *poke*, a dagger: Icel. *piaka*, to thrust, to pick: Norw. *paak;* Sw. *pak*, a stick: prov. F. *poque*, a blow with a ball: Ger. *pochen*, to knock]: to thrust or push against with anything pointed, as with a stick, or as a bull with its horns; to search or feel for, as in the dark; to grope; to search; to feel. POK'ING, imp. busying one's self without a definite object, followed by *about*. POKED, pp. *pōkt*. POKER, n. *pōk'ėr*, one who pokes; an iron bar used to stir fires; a bar of iron for driving hoops on masts. POKER-PICTURES, imitations of pictures executed by singeing the surface of white wood with a heated poker, such as that used in Italian irons. POKING-STICK, a laundress's wooden stirrer. TO POKE FUN, to make fun. TO POKE AT, to thrust the horns at. POKE-WEED, N. Amer. herbaceous plant, producing numerous bunches of black juicy berries; the *Phytolac'ca decan'dra* (see PHYTOLACCA).

POKE, n. *pōk* [Ir. *poc;* Gael. *poca*, a bag: Dut. *poke:* Icel. *poki*]: a sack; a bag; a pouch. TO BUY A PIG IN A POKE—that is, a *pocket* or *bag*—to buy a thing without seeing it, or without knowing its qualities and real value. POKY, or POKEY, a. *pōk'ĭ*, narrow; close; confined.

POKER: game of cards. It is played with a full pack of 52 cards. *Straight Poker* (the original game) is almost pure 'bluff'; so the player has nothing to guide him in judging what the other players hold. Each player puts up a certain amount before the deal. There is no betting. In *Draw Poker* a card is dealt to each player, face up, and the one receiving the lowest card deals. The number of players can be from two to seven, but five is the best number. The terms used are the following: *Age*, or *Blind*, or *Eldest hand*, is the player at the left of the dealer. *Bluff* is betting high on a weak hand, endeavoring to frighten others out of the game. *Call* is when the person whose turn it is to bet last deposits the full amount already bet by the others, and says 'I call,' when all hands must be shown, and the highest wins. *Draw* is to take one or more new cards in place of those discarded, but the privilege is but for once, when the players first look at their hands, and it begins with the *Age*. *To see* is to equal a bet. *Going better* is when one player bets higher than another. *Coming in*, any one entering the game by putting up double the amount of the *Ante* or the *Straddle*. *Going out*, one who gives up his hand and his interest in the amount bet. *Straddle*, double the amount of the ante.

The value of the cards is the same as in whist, that is, ace, king, queen, jack, ten, etc. The value of the hand ranks as follows, beginning at the lowest. *One pair,* a hand that holds a pair, e.g., of queens or fours, etc. *Two pair hand,* a hand with two pairs. If two players hold the same pairs, the one with the highest odd card wins. *Threes,* when a person holds three of the same value. The highest *Three* wins. *Straight,* when the five cards rank in regular order, without regard to suit, e.g., eight, nine, ten, jack, queen. The ace in this hand can count as one. *Flush,* five cards of the same suit, as five diamonds, or five spades, without regard to the value of the cards. The flush containing the highest card wins. *Full hand,* one containing three of a kind and a pair. The hand holding the highest three of a kind wins. *Fours,* a hand which holds four of the same denomination, e.g., four kings, or four twos. *Straight flush* (the highest) is a hand where all the cards are of the same suit and in any regular order, e.g., king, queen, jack, ten, nine. It is better to have a limit decided upon, although it is not obligatory. The game is unfortunate in its association with gambling. There are other vareties of P. Draw P. is regarded by many as especially objectionable because betting is an essential feature, even though no money be at stake, i.e., as played only for the pleasure of winning so many 'chips,' which are disks that represent money in real betting. The same may be said substantially of the 'jack-pot' games of P., in which the stake is made before playing.

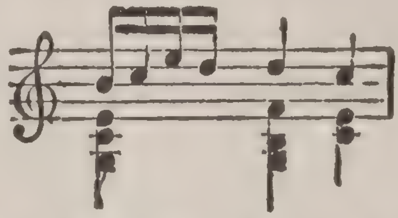
POKHURN, *pŏk-hėrn':* town of India, in the Rajpoot state of Jodhpoor, 340 m. s.w. of Delhi; close to a deserted town of the same name, whose site is marked by a very conspicuous temple on a height. P. has considerable trade. Pop. about 15,000.

POLA, *pō'lâ:* most important naval station of Austria, and one of the most beautiful havens in Europe. The town belongs to the Markgrafate of Istria, and occupies an eminence overlooking the Adriatic Sea, 55 m. s of Trieste. The bay is thoroughly sheltered, and spacious enough to accommodate the largest fleet. The town is surrounded by bastioned walls, is protected by numerous batteries, and is overlooked by the citadel by which it and the bay are commanded. Pop. (1880) 25,173; (1890) 39,273; (1900) 45,205.

P., a very ancient town, is said in legend to have been founded by the Colchians sent in pursuit of Jason. It was destroyed by Julius Cæsar, but rebuilt by Augustus at the request of his daughter Julia, on which account it was named *Pietas Julia.* In ancient times it had 30,000 inhabitants, and was a station of the Roman fleet. It contains numerous and interesting Roman remains, among which are a beautiful and well-preserved amphitheatre, 436 ft. long and 346 broad. A temple and several ancient gates also remain. See Allason's *Antiquities of Pola* (Lond. 1819).

POLACCA, n. *pō-lăk'kă* [Port. *polaca;* It. *polacra*], or Polacre, n. *pō-lā'kėr* [Sp. and F.], or Polaque, n. *pō'lăk* [F.]: vessels common in the Mediterranean, with three masts and a jib-boom; the fore and main-masts each of one piece ('pole-masts'), and the mizzen-mast with a top and top-mast. They usually carry square sails, though a few are rigged with a peculiar form of sail to which also the term *polacre* is applied. The fore and main-masts have, of course, neither tops, caps, nor cross-trees.

POLACCA, n. *pō-lăk'kă* [F. *polaque*], or Polonaise (q.v.): a Polish national dance of slow movement in $\frac{3}{4}$ time. It always begins and terminates with a full bar, and a peculiar effect is produced by the position of its cadence, the dominant seventh in the second crotchet of the bar preceeding the triad on the third crotchet:



The characteristic features of the P. are sometimes adopted in a Rondo, or other lively and brilliant composition, which is then said to be written *Alla Polacca* [It., in the style of the Polacca].

POLACK, n. *pō'lăk* [F. *Polaque*]: in *OE.*, an inhabitant of Poland; a person from Poland.

POLAND, *pō'land;* called by the natives *Polska* (a plain): former kingdom in Europe—renowned in mediæval history as the sole champion of Christendom against the Turks; and through the earlier part of the 19th c. an object of general and profound sympathy throughout w. Europe, from its unprecedented misfortunes. Immediately previous to its dismemberment, P. was bounded n. by the Baltic Sea from Danzig to Riga, and by the Russian provinces of Riga and Pskov; e. by the Russian provinces of Smolensk, Tchernigov, Poltava, and Kherson; s. by Bessarabia, Moldavia, and the Carpathian Mountains; w. by the Prussian provinces of Silesia, Brandenburg, and Pomerania. Its greatest length n. to s. was 713 English m.; e. to w. 693 m.; about 282,000 sq. m. This area had pop. (1880) 24,000,000. The present pop. of the provinces included in the P. of former days consists of Poles, Lithuanians, Germans, Jews, Russians, Roumanians, gypsies, etc. The Poles, 15,600,000, form the bulk of the population; the Lithuanians, 2,100,000, inhabit the n.e. of the country; the Germans, 2,000,000, live mostly in towns and in villages by themselves, and bear the usual character for economy, industry, and that excessive love and admiration for the 'Fatherland' which guided their politics during the last days of Polish independence; the Jews are numerous, reckoned at 2,200,000, but here they are poorer and less enterprising than in other countries; the remainder is composed of Russians (few, excepting in some e. districts), Russian soldiery, Roumans, gypsies, Magyars, etc. As to religion: of Rom. Catholics there are about 9,400,000; Greeks, United and Non-United, 7,900,000; Protestants (mostly Lutherans and German) 2,360,000; the rest are Jews, Armenians, Moslems, etc. This extensive tract forms part of the great central European plain, and is crossed by only one range of hills, which springs from the n. side of the Carpathians, and extends n.e. through the country, forming the watershed between the Baltic and Black Sea rivers. The soil is mostly a light fertile loam, well adapted for cereal crops, though here and there are extensive barren tracts of sand, heath, and swamp, especially in the e. districts. Much of the fertile land is permanent pasture of richest quality; much is occupied with extensive forests of pine, birch, oak, etc. Rye, wheat, barley, and other cereals, hemp, wood and its products, honey and wax, cattle, sheep, and horses, inexhaustible mines of salt, and a little silver, iron, copper, and lead, constitute the chief natural riches; and for export of the surplusage of these products, the Vistula, Dnieper, Duna, and their tributaries afford extraordinary facilities.

The kingdom of P., during the period of its greatest extent, after the accession of the grand duchy of Lithuania in the beginning of the 15th c., was sub-divided for purposes of government into about 40 palatinates or voivodies, governed mostly by hereditary chiefs. The people were divided into two great classes—nobles and serfs. The governing and privileged class included the higher nobles, the inferior nobles (a numerous class, corresponding to the knights, gentry, etc., of other countries), and the clergy; and numbered in all more than 200,000: the serfs were the merchants, tradesmen, and agriculturists, and were attached, not, as in other countries, to masters, but to the soil, being thus much less liable to ill-usage, and retaining more human energy and dignity. The nobles were proprietors of the soil, and appropriated the larger portion of its products, the serfs in many cases receiving only as much as was necessary for the support of themselves and their families. The nobles were chivalrous, high-spirited, hospitable, and patriotic; the serfs, who had also a stake, though a small one, in the independence of the country, were patriotic and good-natured, but sluggish.

History.—The Poles are ethnologically a branch of the Slaves (q.v.). The name appears in history first as the designation of a tribe, the Polani, who dwelt between the Oder and Vistula, surrounded by the kindred tribes of the Masovii, Kujavii, Chrobates, Silesians, Obotrites, and others. The Polani acquired an ascendency over the other tribes, most of whom became amalgamated with the ruling race, whose name thus became the general designation. Polish historians profess to go as far back as the 4th c.; but the lists of rulers which they give are probably those of separate tribes, and not of the combined race now known as Poles. At any rate, the history of P., previous to the middle of the 9th c., is so largely adulterated with fables as to be little trustworthy.—ZIEMOVICZ, said to be the second monarch of the Piast dynasty, is considered the first ruler whose history is to any extent to be relied on; and it was not till a century later, when his descendant, MICISLAS I. (962–992), occupied the throne, and became a convert to Christianity, that P. took rank as one of the political powers of Europe. Micislas (as was the general custom among the Polish rulers) divided his dominions among his sons; but one of them, BOLESLAS I. (992–1025), surnamed 'the Great,' soon reunited the separate portions, and extended his kingdom beyond the Oder, the Carpathians, and the Dniester, and sustained successful war with Emperor Henry II. of Germany, conquering Cracovia, Moravia, Lusatia, and Misnia. He took part also in the dissensions of the petty Russian princes. Under him, P. began to assume unity and consistency; commerce, impartial administration of justice, and Christianity were encouraged; and about the same time, the distinction between the nobles or warrior class (those who were able to equip a horse) and the agriculturists was distinctly drawn. Boleslas was recognized as 'king' by the German emperors.—After a period of anarchy, he was succeeded by his son, CASIMIR (1040–58), whose reign, and that of his warlike son, BOLESLAS II. (1058–81), though brilliant, were of little profit to the country. The latter monarch having with his own hands murdered the bp. of Cracow (1079), P. was laid under the papal interdict, and the people absolved from their allegiance; Boleslas accordingly fled to Hungary, but being, by order of the pope, refused shelter, he is said to have committed suicide (1081).—BOLESLAS III. (1102–39), an energetic monarch, annexed Pomerania, defeated the pagan Prussians, and defended Silesia against the German emperors. A division of the kingdom among his sons was productive of much internal dissension, under cover of which Silesia was severed from P., though still nominally subject to it.—Ultimately, CASIMIR II. (1177–94) reunited the severed portions, except Silesia, and established on a firm footing the constitution of the country. A senate was formed from the bishops, palatines, and castellans, and the rights of the clergy and of the peasantry were accurately defined. His death was the signal for a contest among the various claimants for the throne, speedily followed, as usual, by a division of the country; and during this disturbance Pomerania freed itself from Polish rule. About the same time, the Teutonic Knights were summoned by the Duke of Masovia to aid him against the pagan Prussians; but they soon became as formidable enemies to P. as the Prussians, and conquered great part of Podlachia and Lithuania. The Mongols swept over the country 1241, reducing it to the verge of ruin, and defeating the Poles in a great battle near Wahlstatt. From this time, P. began to decline; various districts were ceded to the markgrafs of Brandenburg, while many districts began to be colonized by Germans. Numbers of Jews, persecuted in w. Europe about this time took refuge in Poland.—LADISLAS (1305–33), surnamed *Lokietek* (the Short), restored unity to the country; judicial abuses and all illegally acquired privileges were abolished, and the first diet (1331) assembled for legislative purposes. In conjunction with Gedymin, Grand Duke of Lithuania, a vigorous war was carried on against the Teutonic Knights, on returning from which the monarch (70 years old) had a triumphant reception from his subjects, who hailed him as the 'father of his country.'—His son, CASIMIR III. the Great (1333–70), greatly increased the power and prosperity of P. by cultivating with zeal the arts of peace, amending the laws, and consolidating his territories by profitable exchanges with the neighboring powers. In the latter part of his reign, he successfully defended sundry new acquisitions against the Tartars, Lithuanians, and Walachians. With Casimir, the Piast dynasty became extinct, after a sway of 510 years, according to the old Polish chroniclers.—His nephew, LEWIS the Great, King of Hungary, succeeded him, by the will of the deceased monarch and the election of the diet; but during his reign, P. was treated merely as an appanage of Hungary. On his death without male heirs, the crown fell to JA-

Lithuania and P., thus doubling the extent, though not the population, of the kingdom. However, his successor, LADISLAS III., was acknowledged only in P. proper, the Lithuanians preferring the rule of the younger son, Casimir. Ladislas was chosen king of Hungary also, and fell at the battle of Varna; being succeeded in P. by CASIMIR IV. (1444–92), who again united it to Lithuania. Casimir recovered W. Prussia from the Teutonic Knights, and compelled them to do homage for E. Prussia, rewarding the inferior nobles, or warrior class, with more extensive privileges, putting them on equality of rank with the great chiefs of the realm, and at the same time necessarily oppressing the peasantry. Manufactures and commerce revived to a wonderful extent during his reign in the w. provinces.—The brief reigns of his three sons were marked only by the increased power of the two houses of the diet, which had by this time absorbed all but the symbols of supreme authority, and had converted P. from a monarchy to an oligarchy—the king possessing little power beyond what his personal influence gave him.—SIGISMUND I. (1506–48), surnamed the Great, fourth son of Casimir, raised the country to the height of prosperity. Generous and enlightened, he was beloved by the masses, whom he endeavored to benefit physically and mentally, while his firmness and justice commanded the respect of the turbulent nobles. He wisely kept aloof from the religious quarrels which distracted w. Europe, by allowing his subjects perfect freedom of choice in religion; he was, however, forced into a war with Russia, in which he lost Smolensk; but was partly compensated by obtaining lordship over Moldavia.—His son, SIGISMUND II., Augustus, was a worthy successor. During his reign many abuses were rectified, and the extraordinary privileges of the higher nobles were curtailed or abolished; Lithuania was finally joined indissolubly to P., and from this time there was to be but one diet for the united realm; each retained, however, its own army, titles, treasury, and laws. Lithuania was at the same time reduced by the annexation of Podlachia, Volhynia, and the Ukraine, to Poland. Livonia was conquered from the Knights Sword-bearers (a community similar to, though much less distinguished, than the Teutonic Knights); and the power, prosperity, and opulence of the state seemed to guarantee its position as the most powerful state in e. Europe for a long time to come. The population almost doubled itself under the two Sigismunds; but this dynasty, whose sway was so happy for P., ceased with them; and the warrior class, having tasted the sweets of freedom, determined to preserve it by rendering the monarchy elective. The election was made by the two chambers of the diet—viz., the senate, or chamber of the chief nobles, and the chamber of nuncios, or representatives of the inferior nobles. He who was chosen king possessed the right of assembling the diet, but had to give a list of the subjects to be discussed; and the representatives, before setting out, were instructed as to the side they were to support. The diet lasted only six weeks, and its decisions were required to be unanimous; so that if the *liberum veto* (the right of forbidding the passing of any measure) were freely exercised even by a single member, all legislation was at a stand-still. The evil effects of these regulations were not so much felt at first, as the members were characterized by honesty and zeal for the general good; but latterly, when venality and subservience to the neighboring powers began to show themselves, all the measures necessary for protecting P. from dependence on her neighbors were, by a few corrupt and treacherous representatives, rendered of no avail.—The first elective monarch was HENRY of Valois (III. of France, q.v.), who, however, soon abandoned the throne for that of France, and was succeeded by STEPHEN BATHORY (1575–86), voivode of Transylvania, a man of energy and talent, who carried on war successfully against the Russians, who had attempted to seize Livonia, pursued them into the very heart of their country, and compelled the czar to sue for peace; he also subdued the semi-independent Cossacks of the Ukraine, and to some degree introduced civilization among them.—His successor, SIGISMUND III. (1586–1632), who was succeeded by his sons, LADISLAS IV. (1632–48) and JOHN CASIMIR (1648–72), was of the Vasa family, and was the crown-prince of Sweden; but his election, far from cementing union between the two countries, only embittered former dissensions. These three Swedish monarchs were most unworthy successors to P.'s ablest king, as they had neither talents for governing, nor characters and sentiments congenial to a warlike nation; on the contrary, their policy was weak, tortuous, and vacillating. Yet they were always quarrelling with their neighbors, declaring war with Russia, Sweden, or Turkey, in the most imprudent and reckless manner, and often without valid pretext. But the Polish armies, though as little fostered and cared for as the other portions of the nation, were everywhere victorious; the Swedish and Muscovite armies were successively annihilated; Moscow was taken, and the Russians reduced to such an abject condition, that they offered to make Sigismund's son, Ladislas, their czar. Sweden made a similar offer to another son of the Polish monarch; but the latter's absurd behavior lost for P. this rich result of her great victories; and the foolish policy of the whole three not only rendered fruitless all the lavish expenditure of Polish blood and treasure, but lost to the country many of her richest provinces, and left her without a single ally; while their religious bigotry commenced that reign of intolerance and mutual persecution between the various sects which was the immediate cause of P.'s downfall. To show the power of the Poles at this period, it will be sufficient to notice that Great P., Little P. (Galicia, Podolia, Ukraine, etc.), Livonia, Lithuania (including Samogitia and Black and White Russia, Polesia, and Tchernigov), Pomerelia and Ermeland, Courland, Moldavia, Bukovina, Walachia, Bessarabia, and Prussia, were either integral parts of the Polish monarchy, or subject to it. The imprudent attempts of the Swedish sovereigns to amend the constitution only excited the suspicion of the nobles, and led to further curtailment of royal authority. During the reign of this dynasty, Walachia and Moldavia were snatched by the Turks from under the Polish protectorate; Livonia with Riga was conquered (1605–21), with part of Prussia (1629), by Sweden; and Brandenburg established itself in complete independence. The Cossacks, who had been goaded almost to madness by atrocious oppression and religious persecution, rose in rebellion, put themselves under the protection of Russia, and ever afterward proved themselves the most inveterate enemies of the Poles. In the reign of John Casimir (1648–72), P. was attacked simultaneously by Russia, Sweden, Brandenburg (the germ of the present kingdom of Prussia), the Transylvanians, and the Cossacks; the country was entirely overrun; Warsaw, Vilna, and Lemberg taken; and the king compelled to flee to Silesia. But the renowned staff of Polish generals was not yet extinct: Czarniecki's sword was as the breath of the destroying angel to P.'s enemies, which, after being defeated in detail, were ignominiously expelled from the country. But in the subsequent treaties, Ducal or E. Prussia was wholly given up to Brandenburg; almost all Livonia to Sweden; and Smolensk, Severia or Tchernigov, and the Ukraine beyond the Dnieper, were given to Russia.—MICHAEL WISNIOWIECKI (1668–74), son of one of the group of famous generals above alluded to, but himself an imbecile, was (contrary to his own wish—for he was aware of his own deficiencies) elected as their next monarch; a war with Turkey, concluded by an ignominious peace, was the chief event of his reign. But the senate rejected the shameful treaty, the Polish army was re-enforced, the Polish monarch resigned the command to John Sobieski the Hetman (q.v.), and the Turks were routed with great slaughter at Chotyn (1673).—After some dissensions concerning the election of a successor, JOHN (III., q.v.) SOBIESKI (1674–96) was chosen; but his reign, though it crowned the Poles with abundance of the laurel wreaths of victory, was productive of no good to the internal administration.—As Sobieski's successor, the Prince of Conti was legally elected, and proclaimed king; but the cabinet of Versailles allowed this splendid opportunity of becoming supreme in Europe to escape; and AUGUSTUS II. of Saxony, protégé of the House of Austria, entered P. at the head of a Saxon army, and succeeded in obtaining the throne. Augustus, unlike all his predecessors, never seemed to identify his interests with those of his Polish subjects; and though he gained their hearts by promising to reconquer for P. her lost provinces, yet this promise was chiefly an excuse for keeping his Saxon army in the country, in violation of the *pacta conventa* (the 'Magna Charta' of Poland). His war with the Turks restored to P. part of the Ukraine and the fortress of Kaminetz; but his war with Charles XII. brought nothing but misfortune. The war with Sweden was unpopular in P.; in fact, the Poles of the e. provinces received Charles with open arms; but his attempt to force on them Stanislas Lesczynski as their king severely wounded their national pride. Augustus returned after the battle of Poltava (q.v.); his rival retired without a contest; a close alliance was formed with Russia, and the Russian troops which had campaigned in P. against the Swedes were, with his Saxon army, retained. The Poles demanded their extradition, but in vain; and the Russian cabinet interfered (1717) between the king and his subjects, compelling both parties to sign a treaty of peace. This was the commencement of P.'s dependence on Russia, and of her consequent decline. By instigation of Peter the Great, the Polish army was reduced from 80,000 to 18,000; and the country was further weakened by diffusion of effeminacy, immorality, and prodigality, through the evil example and influence of the court. Religious fanaticism also developed its most odious features during his reign, and the massacre of the Protestants at Thorn (1724), and the legalized exclusion of them from all public offices, was the result.—The succeeding reign of AUGUSTUS III. (1733–63) was of the same character; the government fell more and more under Russian influence, and its political relations with other countries gradually ceased. Toward the end of his reign, the more enlightened of the Poles, seeing the radical defects of the constitution, the want of a strong central government, and the dangers of the *liberum veto*, entered into a league to promote the establishment of a well-organized hereditary monarchy. But the conservative or republican party was equally strong, and relied on Russian influence; and the conflict between these parties became embittered from the fact that the monarchists supported the Jesuits in disqualifying all dissenters from holding public offices, while the republican party supported the dissidents. The dissidents dated their grievances from 1717, but the great conflict between them and their opponents did not break out till 1763.—The cabinets of St. Petersburg and Berlin now (1764) presented to the Poles STANISLAS PONIATOWSKI as their king. This gross insult, intensified by the incapacity of Stanislas for such an office, could not be borne in quiet; the king and the Russian ambassador were compelled in the diet to listen to the most spirited protests against Russian interference; but the intense national spirit of the Poles only recoiled upon themselves, for the Russian ambassador craftily incited them to insurrection, and kept alive their mutual dissensions. The monarchic or Czartoryski party (so called because it was headed by a Lithuanian prince of this name) had succeeded in abolishing the *liberum veto*, and effecting many other improvements; but they at the same time more severely oppressed the dissidents; and Russia, finding that the political policy of this party was speedily releasing P. from her grasp, joined the party of the dissidents as the champion of religious toleration. Her ambassador caused the chief leaders of the Rom. Cath. party to be secretly kidnapped, and sent to Siberia, and compelled the republicans to accept the protectorate of Russia. The 'Confederation of Bar' (so called from Bar in Podolia) was then formed by a few zealous patriots, an army was assembled, and war declared against Russia. The confederates were supported by Turkey, which also declared war against the czarina; and Russia in alarm proposed to the king and diet an alliance, which both firmly refused.—Frederick the Great of Prussia, who had formerly gained the consent of Austria to a partition of P., now (1770) made the same proposal to Russia, and in 1772 the *first partition* was effected; Stanislas and his diet claiming the mediation and assistance of the other powers of Europe without effect. He was forced in the following year to convoke a diet for the purpose of recognizing the claims of the three partitioning powers to the territories that they had seized; but few members appeared, and these preserved perfect silence. The territories seized by the three powers were as follows:

	Sq. m.	Pop.
Russia	42,000	1,800,000
Prussia	13.000	416,000
Austria	27,000	2,700,009

The whole country was now aroused to its danger; and the diet of the diminished kingdom labored to amend the constitution and strengthen the administration by a liberal code of laws and regulations, which gave political rights to the cities, civil rights to the peasantry, and rendered the kingly authority hereditary. In this they were encouraged by Prussia, whose king, Frederick William, swore to defend them against Russia; but 1791, Catharine II., after great labor, obtained, by intrigues and bribery, the services of *five* (out of 200,000) of the Polish nobility, who protested against the new constitution which had just then (1791, May 3) been established, and drew up a document at Targowitz (q.v.), which they forwarded to the Russian court.—Catharine, thus armed with a pretext for interference, advanced her army; and Prussia proving traitorous, a second fruitless resistance to the united Prussians and Russians, headed by Joseph Poniatowski (q.v.) and Kosciusko (q.v.), was followed by a *second partition* (1793) between Russia and Prussia, as follows:

	Sq. m.	Pop.
Russia	96,000	3,000,000
Prussia	22,000	1,100,000

—which the diet was forced at the point of the bayonet to sanction. The Poles now became desperate; a general rising took place (1794); the Prussians were compelled to retreat to their own country, and the Russians were several times routed; but a new enemy then appeared on the scene. Austria was chagrined at having had no part in the second partition, and was determined not to be behindhand on this occasion; her army accordingly advanced, compelling the Poles to retreat; and fresh hordes of Russians arriving, Kosciusko, at the head of the last patriot army, was defeated; and the sack of Praga, followed by the capture of Warsaw, finally annihilated the Polish monarchy.—The *third and last partition* (1795) distributed the remainder of the country as follows:

	Sq. m.	Pop.
Russia	43,000	1,200,000
Prussia	21,000	1.000,000
Austria	18,000	1,000,000

King Stanislas resigned his crown, and died brokenhearted at St. Petersburg 1798.—The subsequent success of the French against the Russians, and the tempting promises of Emperor Napoleon to reconstitute P., rallied round him a faithful army of patriots, who distinguished themselves in the campaigns of the French against Russia and Austria; but all that Napoleon accomplished in fulfilment of his promise was the establishment by the treaty of Tilsit (1807) of the *duchy of Warsaw*, chiefly out of the Prussian share of P., with a liberal constitution, and the Elector of Saxony as its head. The duchy was an energetic little state, and, under the guidance of Prince Joseph Poniatowski, wrenched western Galicia from Austria (1809), at the same time furnishing a numerous and much-valued contingent to the French armies; but the advance of the grand allied army 1813 put an end to its existence. After the cessions by Austria 1809, the duchy contained 58,290 sq. m., with pop. about 4,000,000.—Danzig was also declared a republic, but returned to Prussia 1814, Feb. 3.—The division of P. was rearranged by the Congress of Vienna 1815, the original shares of Prussia and Austria were diminished, and that part of the duchy of Warsaw which was not restored to Prussia and Austria was united as the *kingdom of P.* (see that article) to the Russian empire, but merely by the bond of a personal union (the same monarch being the sovereign of each), the two states being wholly independent of and unconnected with each other; and the other parts of P. were completely incorporated with the kingdoms which had seized them. The partition of P., as thus finally arranged, was as follows:

	Sq. m.	Pop.(1859.)	Present Political Divisions.
Russia,	220,500	16,000,000	Provinces of Courland, Witebsk, Kovno, Vilna, Grodno, Minsk, Mohilev, Volhynia, Kiev, Podolia; and the *kingdom of Poland* (q.v.).
Prussia,	26,000	3,000,000	Posen, most of W. Prussia, and several districts in E. Prussia.
Austria,	35,500	5.000,000	Galicia, Bukovina, Zips, etc.

Meanwhile, as in mockery of its spirit of independence, the town of Cracow, with a small surrounding territory, was declared free and independent, under guardianship of Austria.—The czar at first gave a liberal constitution, including biennial diets, a responsible ministry, an independent judiciary, a separate standing army, and liberty of the press; and he seemed to take pride in his title of king of P.; but his brother Constantine, having been appointed military gov., speedily put an end to the harmony between the czar and the Poles, and drove the latter into insurrection. Their discontent at first found vent in secret societies; but 1830, Nov. 30, Constantine and his Russians were driven out of Warsaw, and a general insurrection of the people, headed by the aristocracy, took place. Prince Czartoryski was appointed pres. of the provisional govt., and military leaders, as Radzivil, Dembinski, Bem, etc., were soon found; but a general lack of energy in the administration, dilatoriness of the military leaders, and the checking of the spread of the insurrection for fruitless negotiations with Nicholas, were errors fatal to the success of the Poles. 1831, Jan.—Sep. 8, a series of bloody conflicts was fought, in which the Prussians and Austrians, with pitiable subservience, aided the czar. At first, the Poles were successful; but the taking of the capital by Paskevitch (q.v.) soon ended the war, which was followed of course by imprisonment, banishment, confiscation, and enforced service in the Russian army. From this time, the independence of P. was suppressed, and 1832 P. was declared an integral part of the Russian empire, with a separate administration headed by a viceroy of the czar's choosing; the constitution and laws were abrogated; strict censorship of the press and the Russian spy police-system in all its vigor were established; the country was robbed of its rich literary collections and works of art, and the most severe and arbitrary measures taken to Russianize the people. The outbreaks of 1833 and 46 were punished by the gallows. Simultaneous disturbances (1846) in the Prussian and Austrian portions of P. were summarily suppressed; their leaders in Prussia were imprisoned, and saved from death by only the revolution (1848, Mar.) at Berlin; and those in Austria were butchered by the peasantry, who preferred the Austrian to a national govt. 1846, Nov. 6, the republic of Cracow was incorporated with Austria. After the accession of Czar Alexander II. 1855, the condition of the Poles was ameliorated; an act of amnesty brought back many of the expatriated Poles, and various other reforms were hoped for, when, 1861, another insurrection broke out. Its origin is remarkable, and gives insight into the relations between the Poles and their Russian rulers. A large multitude (30,000) had assembled in the neighborhood of the battle-field of Grochow (where two battles had been fought in the spring of 1831), to pray for the souls of those who had fallen; they were engaged in prayer and in religious chants, when they were charged by the Russian cavalry and gens d'armes, several of them killed, and numerous arrests made. This event excited intense national feeling throughout the country; and other national demonstrations, attended with similar massacres on the part of the Russians, produced such intense dislike to the latter, that most of the Poles in the Russian service either resigned or deserted. The Russians immediately had recourse to most severely repressive measures, forbidding all assemblages, even in the churches, punishing those who appeared to mourn the death of relatives killed in the previous massacres, or who wore garments of certain shapes or colors. The application of the Polish nation to the czar (Feb. 28) for the re-establishment of the Polish nationality was rejected, but certain necessary reforms were promised. These reforms were on the whole very liberal; but new disturbances broke out in Oct. of the same year. P. was then declared in a state of siege, and General Luders appointed military commandant under Grand Duke Constantine, nephew of the Grand Duke Constantine above mentioned. The country continued in commotion without any very decided outbreak; attempts were made to assassinate the grand duke and the other Russian officials; and 1863, Jan. 13, Lithuania and Volhynia also were put in a state of siege. The Committee of the National Insurrection issued its first proclamation 1863, Feb.; and a week afterward, Mieroslavski raised the standard of insurrection in the n.w., on the Posen frontier. The Insurrection Committee continued to guide the revolt by issuing proclamations from time to time; and many districts of Augustovo, Radom, Lublin, Volhynia, and Lithuania, were speedily in insurrection. It was a mere guerilla war, and no great or decisive conflicts took place; but the sympathy of Europe was largely enlisted on behalf of the Poles. Remonstrances from Spain, Sweden, Austria, France, and Britain, conjointly and repeatedly, and from Italy, the Low Countries, Denmark, and Portugal, were wholly disregarded by the czar's ministers, and mutual reprisals continued; incendiarism and murder were rampant; the wealthier Poles were ruined by fines and confiscations; and the whole populations of villages were put to the sword by the Russians; while murders and assassinations marked the reign of terror of the National Committee. At last, with the officious assistance of Prussia, and the secret sympathy and support of Austria, the czar's troops succeeded in trampling out (1864) the last embers of insurrection. Great numbers of men, women, and even children, were put to death; crowds were transported to Siberia; and these vigorous measures seem to have restored 'tranquillity, but it is the tranquillity of the desert.' Contemporary with this last outbreak, symptoms of similar disaffection were distinctly noticeable in Prussian P., but a strong force of soldiery in the border districts toward Russia prevented any outbreak. It is noticeable that, except the single revolt of 1846 (which perished almost of itself), no rebellion has ever taken place in the portion of P. belonging to Austria.

PO'LAND, KINGDOM OF: province of European Russia, united to that empire 1815—though the title of kingdom was left, and a peculiar form of government long continued to distinguish it from the other provinces.—It is surrounded by Prussia, Austria, and w. Russia or Russian Poland; area 49,157 sq. m. Pop. (1897) 9,455,943. In 1867 there were 4,326,473 Rom. Catholics, 783,079 Jews, 331,233 Protestants (Lutherans and Reformed), and 259,192 Greek Church (mostly united). The surface of the country is in general very level, with now and then an undulation. In Radom, however, there is a range of hills, some of which rise 2,000 ft. above sea-level. The chief river of P. is the Vistula, which enters the country by its s. boundary, and flows first n. and then n.w., making its exit near Thorn; two of its tributaries, the Wieprz and the Pilica, belong wholly, and a third, the Bug, partially to Poland. The Warta, one of the tributaries of the Oder, drains the w., and the Niemen the n.e., districts. The Vistula and the Niemen are wholly navigable in P.; and the Bug, Narew, and Warta are so for a considerable portion of their course. By these means of communication, the exports of the country are collected at Danzig, Stettin, Memel, and Tilsit, on the Baltic, and the imports introduced into the country. The climate is severe, the summers being very hot, and the winters excessively cold. The soil very much resembles that of the other parts of the former kingdom of Poland, producing magnificent crops of wheat, rye, barley, oats, and buckwheat, the usual leguminous plants, hemp, tobacco, flax, and orchard-fruits. More than 13,000 sq. m. are covered with forests, and fully 8,000 sq. m. waste. Since 1867, Poland is divided for administrative purposes into 10 governments—viz.:

Governments.	Sq. m.	Pop. (1873.)	Pop. (1897.)
Kalisz	4,392	687,371	846,719
Kielce	3,897	586,141	763,746
Lomza	4,667	495,105	585,781
Lublin	6,499	734,018	1,159,463
Piotrkov	4,729	682,495	1,409,044
Plock	4,200	490,143	556.877
Radom	4,769	550,103	820,363
Siedice	5,535	546,945	775,316
Suwalki	4,846	542,750	604,945
Warsaw	5,623	1,090,973	1,933,689
Total	49,157	6,356,049	9,455,943

The pop., about 170 to the sq. m., is more than three times as dense as that of the rest of European Russia. A large proportion of the country people employ themselves in rearing and breeding of horses, cattle, and pigs; sheep are not so common; swarms of bees abound, and there is large export trade in honey. The people of the towns are employed largely in wool-spinning and manufacture of woolen cloth, cotton and linen spinning and weaving, production of liquors, oil, vinegar, glass and earthenware, paper, beer and porter, etc. The most of the commerce is in the hands of the Jews.—P., which had a separate government till 1864, was in that year deprived of the last remnant of its administrative independence. After the suppression of the revolt (see Poland), the country was placed under eight military governors; 1867 the administration was committed to a commission sitting at St. Petersburg; and 1868 the govt. of P. was absolutely incorporated with that of Russia. The total value of Polish industries 1870–80 was about $58,320,000 a year, while the commerce of P. reached $126,360,000. The Warsaw daily press has an issue of 24,000 copies. There were published (1877–81) 296 works in belles-lettres in the Polish tongue, of which 192 were in Poland itself, and 80 in Galicia. About 13,000,000 persons in all, in Russia, Prussia, and Austria, speak Polish.

POLAR, a. *pō´lėr* [F. *polaire;* mid. L. *polaris*, polar—from L. *polus;* Gr. *polos*, the end of an axis, a pole—from *pelein*, to be in motion]: pert. to one of the poles of the earth; situated near one of the poles; proceeding from the regions around either pole. **Polar angle**, on the *terrestrial sphere*, the angle at the pole formed by two meridians; on the *celestial sphere*, the angle at the pole formed by two hour-circles. **Polar bear**, a species of bear inhabiting the arctic regions, having a silvery-white fur tinged with yellow. **Polar circles**, the two parallels of latitude encircling the poles, each at a distance of about 23° 28′—the *north polar circle* is called the *arctic circle* (see Arctic), and the *south* the *antarctic circle.* **Polar distance**, the angular distance of a heavenly body from the elevated pole of the heavens. **Polar clock**, optical instrument invented by Sir Charles Wheatstone, by which the hour of the day is indicated by means of the Polarization of Light (q.v.). **Polarim´eter**, n. *-ĭm´ĕt-ėr*, instrument for measuring the deflection of polarized light. **Polariscope**, n. *pō-lăr´ĭ-skōp* [Gr. *polos*, a pole; *skopĕō*, I see]: instrument for detecting polarized light, or for testing its amount and exhibiting its phenomena; there are several kinds of these instruments, and what is called the analyzer in a polarizing apparatus performs a similar work (see Polarization of Light: also Saccharimeter). **Polarize**, v. *pō´lėr-īz*, to render incapable of exhibiting the ordinary phenomena of reflection and transmission—applies to rays of light when acted upon by certain media and surfaces. **Po´larizing**, imp.: Adj. effecting polarization. **Po´larized**, pp. *-īzd:* Adj. affected by polarization. **Po´larizer**, n. *-ī-zėr*, that which polarizes. **Po´larizable**, a. *-ī-ză-bl*, capable of being polarized. **Polarization**, n. *pō´lėr-ī-zā´shŭn*, the act of polarizing; the state of being polarized, or of having polarity. **Polarity**, n. *pō-lăr´ĭ-tĭ*, the having two poles opposite, with variations in certain physical properties correspondent with the two opposite directions: property possessed by certain bodies of pointing, when freely suspended, toward the poles of the earth, or in certain determinate directions (see below). **Polary**, a. *pō´lėr-ĭ*, that tends or points to a pole.

PO'LAR EXPEDI'TIONS: voyages of discovery toward the n. and s. poles, and to the regions within the Arctic and Antarctic Circles. The n. polar regions present a much greater land-surface than those round the s. pole; thence they have a higher temperature, and offer a more valuable field for discovery, for which reasons, as well as their greater proximity, they have attracted far the most of polar expeditions.

Arctic Expeditions.—Polar expeditions were commenced with a view to discover a shorter route to the golden realms of the East; but the first attempts were made by coasting along the n. of Europe and America: see NORTHEAST AND NORTHWEST PASSAGES. In 1603 the first arctic exploring expedition, consisting of one vessel, the *Godspeed*, commanded by Stephen Bennett, started for a voyage of n. discovery; and this, as well as the succeeding expeditions of Bennett, were engaged in morse-hunting rather than in geographical investigation. In 1607 Henry Hudson (q.v.) was sent out by the Muscovy Company to penetrate to the n. pole, but he was stopped about the n. of Spitzbergen (lat. 81° 30') by the ice. The succeeding voyages of Jonas Poole 1610,11,12, and of Baffin 1613, were not primarily voyages of discovery, and added nothing to the knowledge of the polar regions; but in the expedition of Fotherby and Baffin up Davis' Strait, in the following year, Baffin discovered a n. outlet to the bay called by his own name, which was denominated Smith's Sound. Fotherby was sent out again 1615, and attempted to pass through the sea which lies between Greenland and Spitzbergen, but was again baffled, and compelled to return, after correcting some erroneous observations of Hudson. These seven expeditions were sent out by the Muscovy Company; and the cargoes of seal-skins, oil, teeth, etc., which they brought back helped to defray the expense of their outfit. For the next century and a half the attempts to reach the n. pole were not resumed; but the extraordinary zeal in naval discovery which sprang up in the beginning of George III.'s reign, produced two renewed efforts. The first of these was made in the spring of 1773, by an expedition of two vessels under Capt. John Phipps (afterward Lord Mulgrave), and fitted out by the admiralty purely for scientific purposes. Phipps sailed along the shore of Spitzbergen till he was stopped by the ice at Cloven Cliff; he then coasted forward and backward along the ice-field for nearly a month, trying the various narrow openings, some of which extended two leagues, till he found one which took him into open water. By a sudden change in the temperature he was frozen in, and extricated his ships only after severe labor. The highest point to which he reached was lat. 80° 48' n., less by 49 m. than the most northerly latitude attained by Hudson; and though he had a more than usual amount of difficulties to encounter, yet his failure, with that of Capt. Cook, who attempted to reach the pole by Behring Strait, but penetrated only to lat. 70° 45' n., greatly disheartened other explorers. The offer of £5,000 by the British parliament to the crew that should penetrate to within 1° of the pole awakened no competition; but Scoresby, then (1806) mate of a Greenland whaler from Hull, reached a point directly n. of Spitzbergen, in lat. 81° 30′ n., therefore only about 510 geographical m. from the pole. In later expeditions the same enterprising navigator made many geographical explorations of Jan Mayen's Land and the e. coast of Greenland, largely adding to our knowledge of the character and products of the arctic regions. The subsequent expeditions of Buchan and Franklin 1818, of Clavering 1823, of Graab (Danish) 1828, of De Blosseville (French) 1833, may be considered fruitless for geographical discovery. After the failure of Buchan and Franklin's expedition, the impossibility of ever reaching the pole was generally accepted as fact; but Scoresby, in a Memoir which he communicated to the Wernerian Soc., endeavored to disprove this supposed impossibility, and to show that a journey to the pole might be made without any enormous difficulty or danger. The principal obstacle being the alternation of ice-fields and water, which prevented all advance either by ships or sledges, Scoresby proposed the use of a vehicle which could be used as either a sledge or a boat, and recommended a team of dogs to draw it, they being lighter (for conveyance by water, and for travelling over thin ice) and more tractable than reindeer. After some time this suggestion began to receive attention, and Capt. Parry (celebrated for his discoveries in the polar seas n. of America) was put in command of an expedition fitted out in accordance with Scoresby's plans. He sailed from England in the *Hecla*, 1827, Mar 27, but it was June 22 before the exploring party quitted the ship, which was left on the n. shore of Spitzbergen in charge of a small crew, and betook themselves to the boats; and in spite of the advanced season of the year, they in the first two days advanced to 81° 13′. Here they began to encounter many difficulties; the ice-fields were small, and near each other, necessitating a constant conversion of the vehicle from a sledge to a boat, which could not be effected without unloading it, which consumed much time. This hardship, however, was endurable; but, to Parry's intense chagrin, he discovered, about July 22, that the ice over which they were travelling was moving s. as rapidly as they were advancing n., so that on the 24th, after having travelled apparently 22 m. in the three previous days, they found themselves in the same latitude as on the 21st. Under these circumstances, Parry resolved to return, which he accordingly did, reaching his ship Aug. 21. The highest point reached by him was 82° 40′. A new land, about 200 m. n. of Nova Zembla, to which the name Franz Joseph Land has been assigned, was discovered by the Austro-Hungarian Polar Expedition of 1872–74, under Lieutenants Weyprecht and Payer. Its s coast lies about the 80th parallel, and it was explored, by means of sledges, up to 82° 5′ n., while land was seen extending as far as 83° n. In 1853 Elisha Kent Kane, in the *Advance*, reached lat. 78° 43′ in Smith's Sound, the highest lat. ever till then reached by a vessel in that sea. On the same expedition, Morton discovered Kennedy's Channel, and reached as far n. as Cape Constitution, 82° 27′ n. Hayes, 1860, continuing the exploration of Smith's Sound, reached 81° 35′ by sledge. The *Polaris*, bearing Capt. Charles Francis Hall, steamed without difficulty, 1871, through Smith's Sound into Kane Sea, and through Kennedy and Robeson channels to the Polar Sea: the *Polaris* reached lat. 82° 11′ n. Aug. 29. An English arctic expedition under Capt. Nares 1875–6 reached, through Smith's Sound, the highest latitude till then attained, 83° 20′. Lieut. Lockwood and Sergt. Brainerd, of the American Arctic Expedition, 1883, under Lieut. Adolphus W. Greely, U.S.A., reached 83° 24′. Of the party of 25 who landed at Discovery Harbor (lat. 81° 44′ n., long. 64° 45′ w.) with Greely, 1881, Aug. 12, only 6 were alive when the relief ships under Commander Schley came to the rescue, 1884, June 22; the survivors could hardly have lived 2 days more had help not arrived. Five expeditions were being fitted out or were in the Polar Sea 1894, of which the most notable was the one under Robert E. Peary (q.v.), civil engineer, United States navy, because of the pertinacity of the leader in his quest. He had visited Greenland 1886, led an expedition 1891–2 fitted out by the Academy of Natural Sciences of Philadelphia, and started 1893 for a two years' stay, returning to St. John's, Newfoundland, 1895, Sept. 21. His explorations added much to the geographical knowledge of the region. Dr. Frithjof Nansen, of Norway, who sailed in the *Fram* in 1893, returned in 1896, having attempted to find the pole by the drifting method. He reached the highest point, n. lat. 86° 14′, and established the fact that there is no open polar sea. In 1897 Solomon A. Andree, a Swede, with two companions, left Dane's island n. of Spitzbergen in a balloon, hoping to drift across the pole, but no definite information concerning them was ever received. In 1898 five expeditions set out. Capt. Otto Sverdrup, in Nansen's ship, the *Fram*, left in June and returned 1902, Sept. 19. He discovered what is believed to be the farthest land lying between the American continent and the pole w. of Greenland; a great island north of the Parry islands. Peary, 1898-1902, explored and mapped large parts of Ellesmer Land and Grinnel Land, rounded the northern coast of Greeland, and reached lat. 84° 17′. In 1899, June, the Duke of Abruzzi led an expedition in the *Stella Palace*. Some of his party in sledges reached (1900) lat. 86° 33′n., the highest point yet attained. See NORTHEAST and NORTHWEST PASSAGES.

Antarctic Expeditions.—The attempts to penetrate to the s. pole are of very recent date, mainly because a knowledge of the s. polar regions is valuable to Europeans for science only. Cook and Furneaux are the first navigators known to have crossed the Antarctic Circle, but the former penetrated only to lat. 71° 10′ s., and neither made any discoveries of importance. Bellinghausen, Russian navigator, reached lat. 70′ s. 1819; and two years later discovered Alexander's Land and Peter's Land, then the most southerly islands known. In 1823 Capt. Weddell reached lat. 74° 15′ s., long. 34° 16′ w., and saw beyond him an open sea to the south, but made no important additions to geographical knowledge. In 1831 Capt. John Biscoe discovered Enderby Land; 1839, the sealing-schooner, *Eliza Scott*, from New Zealand, discovered Sabrina Land (q.v.); and in the same year was sent out the U. S. expedition under Capt. Wilkes, which resulted in the discovery 1840, Jan., of what he with reason supposed a continuous coastline, though an ice-line 8 to 12 m. in width prevented him from establishing its continuity beyond dispute. The (supposed continental) coast stretched from Ringold's Knoll on the e. to Enderby Land on the w., and was distinguished by absence of currents to disturb the ice-barrier, and by a much less precipitous character than is usual with islands. In 1840 a French expedition under D'Urville discovered a line of coast directly s. from Victoria (Australia) on the Antarctic Circle. But the most important discoveries were by Capt. (afterward Sir James) Clarke Ross, who made three voyages 1841–43, discovering Victoria Land (q.v.), and tracing its coast from lat. 71° to lat. 78° 10′ (the highest s. latitude ever attained). In his third voyage Ross proved that the lands discovered by D'Urville were islands of no great size; and his expedition supplied also much important information in nat. history, geology, and especially Magnetism (q.v.). Ross's geographical discoveries have since been confirmed.

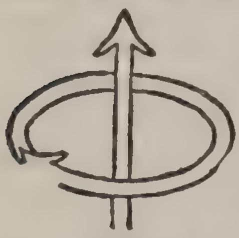
What was denominated the most important geographical discovery in the Antarctic region since Ross traced a part of the coast of Victoria Land, was that made by Capt. Larsen, a Norwegian whaler, while seeking seals, 1893, Nov.–Dec. The publication of his thrilling log in the *Scottish Geographical Magazine* excited intense interest among geographers and scientists. But the modest address of a young Norwegian explorer, C. Egeberg Borchgrevinck, at the Sixth International Geographical Congress, in London, England, 1895, Sep., proved a far greater sensation. He had accompanied Larsen as a seaman, intending if possible to explore the region. He confirmed the points of information in Larsen's log, and detailed his individual experiences, exhibiting maps, and calling attention to many errors in the popular understanding of that region. In 1898 he led out an expedition, and in 1900 returned, having reached the farthest point, 78° 50′ s. and 195° 50′ e. In 1898 a Belgian expedition under Capt. de Gerlach discovered 500 m. of new land. A German expedition under Prof. von Drygolski, 1901-03, discovered new land. In 1901 British and Scottish expeditions were sent out.

POLARIS: see POLE-STAR.

POLARISCOPE, *pō-lăr′ĭ-skōp:* instrument for determining the action of liquids on polarized light, and thus determining their contents of the polarizing ingredient. It is usually employed for analyzing sugars, the polariscope test being adopted by the U. S. govt. for determining duties on sugars. See SACCHARIMETER.

A tube like a short telescope is mounted horizontally on a stand. Its centre has a place for a glass-capped tube about 6 inches long, in which the sugar solution is placed. The telescope has at one end a polarizer which transmits through the apparatus the ordinary polarized ray, the extraordinary being refracted out of the field. This ray then passes through two quartz plates placed side by side, by which it is subjected to rotary polarization, both right and left-handed; one way for its right-hand and the other for its left-hand portion. The composite ray passes through the solution. As this has a rotary polarizing power, it adds to the polarization of one-half of the beam, and subtracts from that of the other so that the spot or disk of light seen through an analyzer in the eye-piece has two colors. Between the end of the liquid-containing tube and the observer are a pair of wedge-shaped quartz plates; by sliding these over each other, their aggregate thickness is increased or diminished until both halves of the disk, as seen through the doubly-refracting prism or analyzer in the eye-piece, appear of one color. This occurs when the thickness of the quartz plates is such as to exactly compensate for the liquid in the tube. A vernier is provided by which the position of the wedge-shaped quartz plates can be read off, and this is graduated so as to show the rotatory power of the liquid. By using (in the saccharimeter) definite weights of sugar and water for the solution, the readings are made to correspond to percentages. There are several refinements, omitted in this description; and the different types of polariscope present several variations. The above gives an idea of the leading features of construction. The P. is applied sometimes in medical practice to determine the percentage of sugar in diabetic urine.

POLAR′ITY: the having two poles opposite. The n. and s. poles of the earth's axis are familiar terms; and so are the derived terms of the n. and s. poles of a Magnet (q.v.). A right-handed and left-handed corkscrew, or helix, also are well known. The distinction between the members of any of these pairs leads us to the consideration of P., which it is difficult to define except by illustrations. In the case of the helix, it is the difference between right-handed and left-handed; not as in a magnet, the difference between the two ends. If we look closely into the question, we find that it is impossible to define the term 'right-handed rotation' in the abstract. We may define it as being the same as that of the hands of a watch, or that of the apparent motion of the celestial bodies about us *in this northern hemisphere;* but to a person at the equator, or to one who had never seen a watch, such comparisons would be without meaning. In fact, it is impossible to give a definition of even such a simple term as *right* (*hand*). *east*, *down*, etc., independent of reference to the motion or position of some external object. But there is, in many cases, an important scientific reality underlying, perhaps causing these difficulties. To a spectator looking down upon the n. pole of the earth, the axial rotation would appear to be left-handed, or opposite to that of the hands of a watch; while at the s. pole the appearance is the reverse. In fact, as motion in a horizontal straight line appears to be from right to left, or from left to right, according to the side on which the spectator stands; so motion in a curve appears to be right-handed or left-handed, according to the side of its plane from which it is looked at. And this is now known to be the cause of the difference of poles in a magnet; the hypothesis of two magnetic fluids is dismissed, and Ampère's explanation, that in a magnet currents of electricity revolve round each particle in planes perpendicular to the direction of magnetization, at once accounts for the dissimilarity of the poles. Such a figure as this gives a clear idea of the subject. A little electric current, such as that in the figure, in which positive electricity passes in the direction indicated by the arrow-head, acts on external bodies exactly as a small magnet would whose axis is, as in the cut, perpendicular to its plane, the arrow-head representing the *north* pole; that is, the pole which turns toward the *South*. Again, an electric current passing in a straight wire would at first sight appear altogether independent of polarity; yet it is found that such a current moving in the *straight* line in the cut, in the direction of the arrow-head, tends to make the *north* pole of a magnet rotate round it in the direction indicated by the arrow-head in the circle. Again, there are certain crystals, which, when heated, become electric. One end of a prism of tourmaline, for instance, takes positive, the other negative electricity. Also certain crystals of quartz cause a ray of polarized light, which passes along their axis, to rotate right-handedly; others left-handedly. The difference in these cases is due to molecular arrangement, other effects of which are easily seen in the tourmaline, in the dissymmetry of the two terminals of the prism, and, in quartz, in the position of certain small faces of the crystal, so that a preliminary inspection enables us to predict the direction of the effect to be obtained from any particular specimen. The term has various other applications, among the least defensible of which is that to light: see POLARIZATION OF LIGHT.



POLARIZATION OF LIGHT: change produced on rays of light by the action of certain media through which they pass, or by the action of certain surfaces which reflect them, so that the rays come to be no longer uniform, but have different properties in different directions. A ray of light from the sun or a lamp, which has not been reflected or refracted in its course to the eye, possesses no properties by which one *side* of it can be distinguished from another; if, e.g., it be divided into two by a colorless doubly-refracting crystal, such as Iceland spar, these two rays will be of apparently equal intensity in whatever position the crystal be placed (see REFRACTION, DOUBLE). But if the ray has been reflected from a surface of glass or water, it is found that in general the intensities of the two rays into which it is divided by the doubly-refracting crystal are not only unequal, but dependent on the position of the crystal with reference to the plane in which the light was previously refracted or reflected. This is conclusive proof that the light has undergone some change by reflection or refraction, so that it is no longer the same all round, but possesses *sides* (in the language of Newton), or (in modern phraseology) is *polarized*. Perhaps the most complete illustration of this very important fact is found by using two doubly-refracting bodies—two small crystals of Iceland spar, e.g.—and pasting on a side of one of them a slip of paper with a pin-hole in it. Looking through this crystal, the covered side being turned toward a bright body, we see two images of the pin-hole, *equally* bright. Look at these through the second crystal, each is in general doubled; we see four images of the pin-hole, but these are generally *unequal* in brightness; and by turning either of the crystals round the line of sight as an axis, we find that there are positions, at right angles to each other, in which only *two* images are visible. If we turn further, the lost images appear faint at first, and gradually become brighter, while the others become fainter in proportion; till, when we have completed a quarter of a revolution, the new images alone remain, the others having disappeared. From this it follows that each of the rays into which a single beam of light is decomposed by double refraction possesses *sides*, or is polarized; and to such an extent as to be incapable of being again doubly refracted in certain positions of the second crystal. By taking advantage of the difference of the refractive indices (see REFRACTION) of the two rays produced by Iceland spar, and the close agreement of one of them with that of Canada balsam, Nicol constructed his 'prism,' one of the most useful pieces of polarizing apparatus. It consists of two pieces of Iceland spar cemented with Canada balsam, and *allows only one of the two rays produced by double refraction to pass through.* When we look at a flame through two Nicol's prisms in succession, we find that the amount of light transmitted depends on their relative position. If they are *similarly* placed, we have the maximum amount—viz., half the incident light; if they are *crossed*, i.e., if one be made to rotate through a right angle from the position last mentioned, *no* light, not even the most powerful sunlight, can pass through the transparent combination. There are certain doubly-refracting bodies, e.g., tourmaline, iodosulphate of quinine, etc., which by absorption stifle one of the two rays into which they divide a beam of light; and which act therefore precisely as Nicol's prism does. But they have the great disadvantage of *coloring* the transmitted light very strongly; and this renders them unfit for the study of the gorgeous phenomena of color (perhaps the grandest displays in optics) produced by polarized light. But for the verification of the facts to which we now proceed, a tourmaline or a Nicol's prism will do equally well, and will be called the analyzer. And first as to the reflection of light, a cause of polarization first detected by Malus. If we examine by the analyzer light reflected from water, unsilvered glass, polished or varnished wood, jet, etc., we find that it is more or less completely polarized; but that there is a particular angle for each substance, at which if light be reflected (see REFLECTION) from its surface it is completely polarized; that is, can be completely stopped by the analyzer in certain positions, just as a ray which has passed through a Nicol's prism. It was discovered by Brewster that this angle, called the *polarizing angle*, has its tangent equal to the index of refraction of the reflecting body: or, in another form, the reflected light from a surface of glass, water, etc., is completely polarized when its direction is perpendicular to that of the corresponding refracted ray. The light reflected from the second surface of a glass plate is also completely polarized at the same angle; and one of the most useful polarizers which can be made is a pile of thin glass plates, from the surfaces of which light is reflected at the proper angle, which is for ordinary window-glass about 54°. The light which passes through the glass plates is partially polarized, and its polarization is more nearly complete the greater the number of plates employed. And it appears that these rays are polarized in planes perpendicular to each other—i.e., that the analyzer which extinguishes the reflected ray has to be turned through 90° to extinguish the refracted ray.

In order that we may arrive at some ideas as to the nature of polarization, we must consider on the basis of the Undulatory Theory of Light (q.v.) *how* a ray of light can have sides. If we take, for a comparison, waves of sound, on the theory that in them (see SOUND) the particles of air move forward and back in the line in which the sound travels, we see that a beam of sound cannot possibly have sides, since the motions of the particles of air in it are precisely the same from whatever side we consider them. Next take waves in water, where we see the water rising and falling as the undulation (*not* the water) travels uniformly onward in a horizontal direction; and this at once gives the required analogy. So far as phenomena of Interference (q.v.; see also DIFFRACTION) are concerned, waves, whether in air or in water, present them, so that they show us merely that light depends on undulations, but not the kind of undulation. But when, from the facts of polarization, we find that a ray of light can have sides, we see that the vibrations of the luminiferous medium must be *transverse to the direction of the ray.* Common light, then, consists of vibrations which take place indifferently and in succession in all directions transverse to that of the ray; while light completely polarized has its vibrations limited to a *particular* transverse direction. A Nicol's prism allows no light to pass through it except that which vibrates in a particular transverse direction, depending on the position of the axes of the pieces of Iceland spar of which it is made. Light which has passed through one Nicol's prism is sifted so as to contain none but such transverse vibrations, and will of course pass freely through a second prism, or be completely or partially stopped by it; according as the two prisms are similarly situated, or turned so that the directions of the vibrations that they can transmit are inclined at right angles, or at any other angle.

It is not yet settled what the direction of these vibrations is in any particular case; whether they take place *in*, or *perpendicular to*, the plane of polarization; and the point is extremely important in the theory of the subject, though not to the explanation of the ordinary experimental results. To explain the nature of this difficulty, we merely mention the simple case of polarization by reflection at a glass plate. Do the vibrations of the reflected ray take place *perpendicular to* the plane of reflection (i.e., parallel to the reflecting surface), or do they take place *in* the plane of reflection? Some high authorities are in favor of the latter hypothesis, but the general opinion of scientific men at present unquestionably leans to the former. Many delicate experiments have been made to decide the question, but their results have been irreconcilable with each other. From the results above arrived at, it is evident that the oscillations, or vibrations of the luminiferous medium, of which light consists, are similar to those of the bob of a Pendulum (q.v.), the ray in this case being supposed to proceed vertically downward. Polarized light consists of vibrations analogous to those of the ordinary pendulum, forward and backward in a line. But we have seen that any motion of the pendulum may be compounded of two such motions in planes perpendicular to each other. This is analogous to the decomposition of common light by a doubly-refracting crystal into two rays polarized at right angles. But we find in nature, and can produce artificially, motions of the luminiferous medium resembling exactly the elliptic, and circular, motions of the (conical) pendulum. They occur in nature in all cases of reflection from metallic surfaces, also from the surfaces of highly refractive bodies, such as diamond, etc. The easiest artificial method of procuring them is to allow polarized light to pass through a thin plate of a doubly-refracting crystal, such as a film of mica. Thus, if OA be the direction of vibration of the polarized light, the ray moving perpendicularly to the paper, *Oa*, *Ob*, the directions (at right angles to each other) of vibration of the two rays into which it is divided by the mica, we have only to let fall from A perpendiculars on Oa and Ob to determine the extent of the resolved vibrations in these directions. Now if the two rays moved equally rapidly through the mica, they would simply recombine on leaving it into a single plane polarized ray, whose vibrations would be represented by OA as before. But, in general, one of the rays is retarded more than the other, and the combination of two such oscillations is seen by geometrical considerations to give an ellipse whose centre is at O; and which touches each side of the rectangle of which Aa and Ab are half sides. The limiting forms of these ellipses are, of course, the diagonals of the rectangle; so that there are two cases for the light remaining plane polarized after passing through the mica, for an infinite number in which it will be elliptically polarized. Also the difference of retardation of the two rays may be such as to correspond to a description of these ellipses either right-handedly or the opposite. In particular cases the ellipse may be a circle; then it is obvious that the rectangle must become a square, that the directions of vibration of the two rays in the mica must be equally inclined to that of the original polarized ray, and that one ray must be retarded an odd number of quarter oscillations more than the other. If it be 1, 5, 9, etc., quarter oscillations, the rotation is in one direction; if 3, 7, 11, etc., it is in the opposite. Circularly polarized light cannot be distinguished by the eye, even with the help of a Nicol's prism, from common light; but by interposition of a thin plate of a doubly-refracting crystal, phenomena are produced which common light cannot give. Before leaving this part of the subject, it is to be remarked that the composition of two equal and opposite circular vibrations produces a plane vibration, whose plane depends on the simultaneous positions of the revolving bodies in their circular orbits. Hence a plane polarized ray may always be considered as made up of two circularly polarized rays, and if these pass through a medium which retards one more than the other, the plane of polarization of their resultant, when they leave the medium, will in general not be the same as that of the incident ray. In other words, the plane of polarization will have been caused to rotate through a certain angle proportional to the difference of retardation of its circular components. This is the explanation of what Biot called *Rotatory Polarization* in quartz, turpentine, sugar, etc., and of the rotation of the plane of polarization discovered by Faraday when a polarized ray passes through a transparent body under the action of a magnet

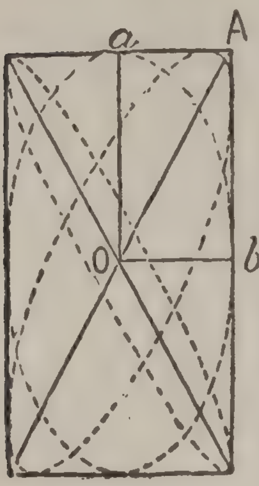


Fig. 1.

In the first of these cases, the retardation is due to molecular heterogeneity; in the second, it depends on molecular motions produced by the magnet. The effect is greater in each case the more refrangible the rays; therefore, when the light which has passed through the medium is examined with an analyzer, the successive colors of the spectrum are cut off each at a different angle, and the observed tint is that compounded of those which remain. The Saccharimeter (q.v.), for the determination of sugar in a liquid, is an application of the first case; the second has not as yet been applied to any practical purpose, but it has given most valuable information as to the ultimate nature of magnetism.

When polarized light passes through a slice of any uniaxal double-refracting crystal, nearly in the direction of its axis, it is obvious that the difference of retardation of the two rays into which it is divided will depend only on (1) their refrangibility, (2) their inclination to the axis of the crystal. Hence, if we suppose the light homogeneous, the effects of interference, and subsequent application of the analyzer, must be to produce appearances of bright and dark spaces, symmetrically disposed round the axis; that is, a series of concentric circular rings. The superposition of the separate sets of rings, for each color of the spectrum, produces the appearance actually observed; a series of colored rings, like those known as Newton's Rings, due to Interference (q.v.). Besides these, however, there is a dark or bright cross, consisting of two black or white bands, intersecting each other in the common centre of the rings. The dark bands are due to the absolute stoppage by polarizer or analyzer, when placed in positions 90° from symmetry, of all light whose vibrations are executed in the principal planes of the polarizer and analyzer. A similar explanation applies to any other case. The system of colored rings thus produced is one of the most splendid results of optical combinations; and may be seen by any one by the help of such simple apparatus as two fragments of window-glass and a piece of clear ice from the surface of a pond. In undisturbed freezing, the axis of the ice crystal is perpendicular to the surface of the water, and the cake of ice is therefore, as it were, cut for our purpose. If light be reflected at an angle of about 54° from the first

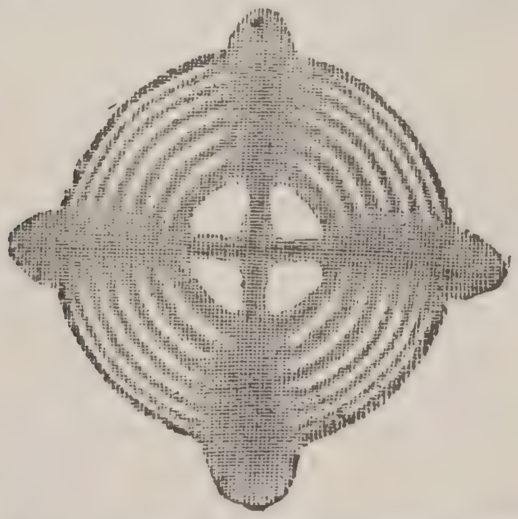


Fig. 2.—Uniaxal Crystal ; Black Cross.

piece of glass, pass perpendicularly through the ice, and be again reflected (at 54°) from the second piece of glass, the phenomena above described, and rudely represented in the annexed cuts, will be at once seen, the appearances varying with the relative position of the planes in which the reflections take place from the pieces of glass. If these planes be at right angles to each other, we have the black cross as in the first figure; if parallel, the white cross as in the second.

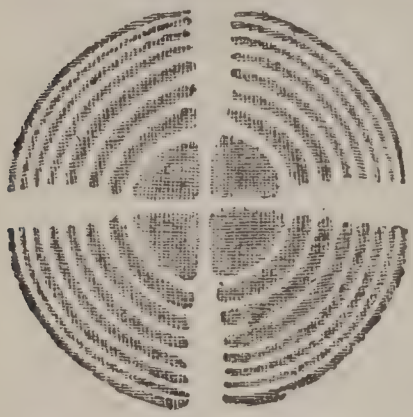


Fig. 3.—Uniaxal Crystal; White Cross.

If, instead of a uniaxal crystal, a biaxal crystal, e.g., nitre or arragonite, be employed, the system of colored rings and dark brushes is more complex; symmetry now requiring their arrangement about the *two* optic axes. The general appearance of the rings and brushes depends now not only on the relative position of the polarizer and analyzer, but also on the position of the crystal (which is no longer symmetrical about an axis) with reference to these planes. The two following figures illustrate the nature of the change due to an alteration of the position of the crystal, the polarizer and analyzer being fixed in planes at right angles to each other.

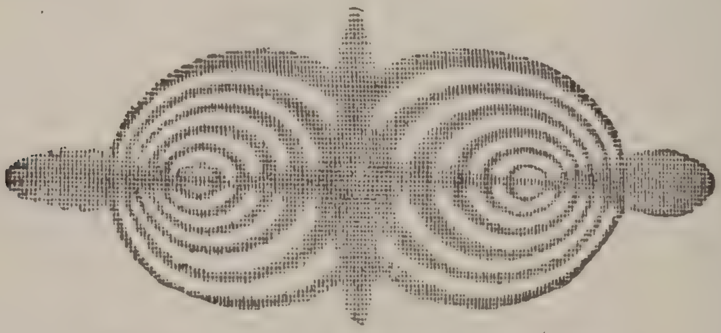


Fig. 4.—Biaxal Crystal; Black Cross.

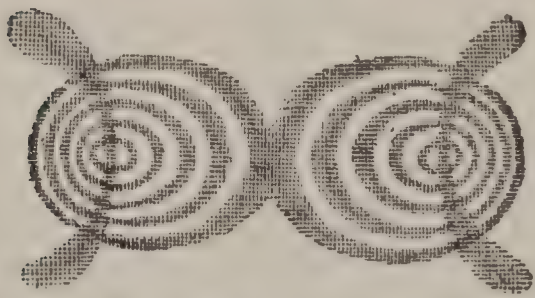


Fig. 5.—Biaxal Crystal; Black Cross changed to hyperbolas by rotating the crystal.

By employing circularly or elliptically polarized light, these appearances may be still further varied.

Every doubly-refracting body produces a change on polarized light which passes through it. Hence the application of the polarizer and analyzer (usually glass mirrors, or Nicol's prisms) to the microscope is often of very great use in detecting crystalline, and other structural peculiarities. Solid bodies, e.g., glass, which are singly refractive, become doubly refractive when strained either by external forces or by unequal heating. A permanent state of strain is produced in glass when it is cooled quickly. All these phenomena are beautifully exhibited by polarized light. Again, the application of polarized light is sometimes of great importance in qualitative analysis, where only an exceedingly small quantity of a substance is procurable for examination, by enabling the chemist to determine whether a minute crystal is doubly refractive or not.

A practical application of a polarizing prism may be mentioned. In salmon spearing it is often exceedingly difficult to see the fish at the bottom of the stream, on account of the glare of light reflected from the surface. But as this light is always partially, sometimes wholly polarized, a great part of it may be arrested by the analyzer held in a proper azimuth; while the light escaping from the water will suffer little loss.

The light of the sky, being mainly reflected light, is of course partially polarized. The investigation of this subject has been most ably conducted by Brewster (*Trans. R. S. E.*, 1862-3).

POLDER, n. *pŏl'dėr* [Dut.]: in the topography of the Netherlands, land below the level of the sea or nearest river, which, originally a morass or lake, has been drained and brought under cultivation. An embankment, forming a canal of sufficient height to command a run toward the sea or river, is made, and when carried quite round, as in the case of the Haarlem Lake, it is called the *Ringvaart*. At one or more points on the embankment apparatus for lifting water is placed, and worked by wind or steam-power. If the lake deepens toward the centre, several embankments and canals are necessary, the one within the other, formed at different levels as the water-surface becomes lessened, a connection being maintained with the outer canal, which secures a run for the drainage water. In the Schermer polder, N. Holland, are four canal levels, the land between forming long parallelograms. The water from the inner space is lifted into the first canal; that again, with the drainage of the second section, is thrown into the second, and so on until the outer canal is reached, and a fall obtained. The Netherlands polders are very numerous. The Beemster, a rich district of N. Holland, water till 1612, is crossed at right angles by fine avenues, and dotted with farm houses and orchards, and has a pop. of 5,000. The Zype, Schermer, and Purmer are fertile polders, but the most important is the drained Haarlem Lake (q.v.). The land reclaimed amounted to 46,000 acres, and now maintains a pop. of 14,000. The soil is in some places sandy, in some loamy, elsewhere clay or peat, and differs much in fertility, some parts being positively barren. The chief products are grain, cattle, butter, cheese, seeds, flax, colza. The total outlay on the enterprise of draining was $5,248,800; but as the ground reclaimed sold for an aggregate of $3,790,800, the actual cost was only $1,458,000. On the reclaimed area are four or five villages, and seven or eight churches. Several extensive tracts of land have been recently reclaimed from the Ij, and formed into valuable polders.—See DIKE.

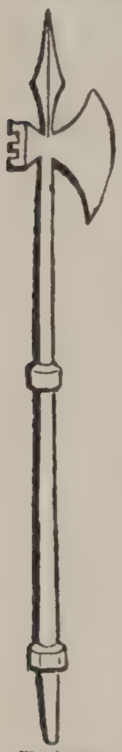
POLE, n. *pōl* [AS. *pal*, a pole; L. *pālus*, a pole: Sw. *pale*, a stake: Ger. *pfahl:* W. *pawl*, a pole]: a long, slender piece of wood; a long staff; a measure of length, 16½ feet or ¼ chain; in *land-measure*, 30¼ square yards; a mast. BARE POLES, state of a vessel having all the sails closely furled or down: V. to furnish with poles. POL'ING, imp. POLED, pp. *pōld.*

POLE, n. *pōl:* a native of Poland.

POLE, n. *pōl*, plu. POLES, *pōlz* [F. *pôle*—from L. *polus*, the end of an axis: Gr. *polos*, a pivot on which anything turns—from *pelein*, to be in motion: It. *polo*]: the extremities of the earth's axis; the extreme points of the axis on which the celestial sphere revolves; in *geom.* and *astron.*, the extremities of an axis of rotation of a sphere or spheroid; in *spherics*, the extremities of the straight line perpendicular to the plane of the circle, and passing through its centre; the two points in a magnet in which chiefly appears the concentration of its attractive or repulsive energy. POLES OF THE EARTH, the two points in which the axis of the earth meets its surface (see POLES, in *geog.*). POLES OF THE HEAVENS, or CELESTIAL POLES (see POLES, in *astron.*). POLES OF THE HORIZON, the zenith and the nadir (see POLES, below). POLES OF THE MERIDIAN, the points of the horizon due east and west (see POLES, below). MAGNETIC POLES, the two points on the earth, near the poles, at which the dipping-needle is vertical, or the magnetic intensity greatest.

POLE, *pōl*, Cardinal REGINALD: 1500, Mar. 3—1558, Nov. 18; b. Stourton Castle, Staffordshire, England; son of Sir Richard P., Lord Montacute, by Margaret, Countess of Salisbury, daughter of the Duke of Clarence, bro. of Edward IV. His early education was received from the Carthusians at Sheen, whence, being liberally provided for by the king, his relative, he passed to Magdalen College, Oxford, and having received deacon's orders, was advanced to several valuable preferments, through the favor of Henry VIII. For further study, he went to the Univ. of Paris, and thence to Padua, where he formed the friendship of a distinguished group of scholars and friends. In 1525 he returned to England, where the highest ecclesiastical dignities awaited his acceptance. But about this time Henry had resolved on the divorce from his queen Catharine, and P. not only withheld his assistance from the project, but provoked the undying resentment of the king by his well-known treatise, *De Unitate Ecclesiasticâ*. His preferments and pension were withdrawn, and preparations were made for his impeachment. This, and probably still harsher measures, he evaded by withdrawing from England. The king's resentment fell instead on his elder brother, and on his aged mother, the Countess of Salisbury. During the rest of Henry's reign, P. remained in exile. The pope, for the maintenance of whose authority, in the cause of the injured Catharine, P. was regarded as a martyr, treated him with distinguished favor, and elevated him to the cardinalate. He was employed in many affairs of highest importance, being sent as legate 1537 to France and the Low Countries, from both which states Henry VIII in vain demanded his extradition. He was active also in the discussions on the Interim; and when the Council of Trent was opened, he was appointed one of the three legate-presidents who acted in the name of the pope, Paul III. (q.v.). On this pontiff's death 1549, P. was almost elected to succeed. For some time after Paul's death, he resided chiefly in a monastery near Verona, until the accession of Mary called him back to active life, as the main instrument of the reconciliation of England with the papacy. 1554, Nov. 24, P. solemnly entered London as legate and plenipotentiary of the Roman see, possessing in an equal degree the confidence of the queen. In his arduous charge, he acquitted himself with prudence, and (as is asserted by some) with singular moderation for those times. In the religious or politico-religious severities which marked the later history of Mary's reign, it is asserted by some that P. had no share; others hold P. as Mary's chief adviser equally guilty with her. He was created Abp. of Canterbury 1556, and Chancellor of the universities of Oxford and Cambridge. The new pope, Paul IV., who was personally unfriendly to P., removed him from his legateship and charged him with heresy; and under this shadow P. died, less than 24 hours after the death of the queen. He was author of treatises on the authority of the Roman pontiff and the Reformation of England, and of very many letters, of great interest and importance for the history of the time.

POLEAX, n., or **Poleaxe**, n. *pōl'ăks* [Dut. *bollen*, to fell, to knock down—from *polle, pol,* or *bol*, the head, and *ax* (see under Poll 1)]: ax for knocking one on the *poll* or head, now used in slaughtering cattle: an ax or hatchet with a long pole or handle. There were many varieties of this arm, passing from a great hand-ax to an ax-headed spear or halbert, several of the longer sorts bearing but little resemblance to an ax. In *nav.*, a boarding-hatchet used for boarding or resisting boarders—a hatchet with handle about 15 inches long, and a sharp point bending downward at the back opposite the blade.



Poleax.

POLECAT, n. *pōl'kăt* [Dut. *pool-kat*, a polecat—a supposed corruption of *foul-cat:* OF. *pulent*, stinking], or **Fitchet** (*Mustela putorius*, or *Putorius fœtidus*): quadruped of the Weasel family (*Mustelidæ*), referred usually to the same genus with the weasel, stoat, or ermine, etc. It is the largest Brit. species of the genus. The length of the head and body is about 18 inches, length of tail more than five inches, the form stouter than that of the weasel or of the ermine. Its color is a deep blackish-brown; the head, tail, and feet almost black, under parts yellowish, ears edged with white, and a whitish space round the muzzle. The hair is of two kinds—a short woolly fur, pale yellow, or somewhat tawny; and long shining hairs of rich black, or brownish-black, most numerous on the darkest parts. The nose is sharp, the ears short and round, the tail covered with longish hair. There is a pouch or follicle under the tail, which exudes a yellowish, creamy substance of a very fetid odor; and this odor is particularly strong when the animal is irritated or alarmed. Hence, apparently, its name *Foumart* (*Foul Marten*), with various provincial modifications, e.g., *Fulimart*, *Thoumart*, etc. The origin of the names P. and Fitchet is much more uncertain. Skeat suggests that it may be *pool-cat*—i.e., cat living in a hole or burrow, since the Irish and Gael. *poll*, Cornish *pol*, mean a 'hole' or 'pit,' as well as a 'pool.' The P. was much

Polecat (*Mustela putorius*).

more common in Britain in former times than now, and is almost extirpated from some districts. It is extremely destructive in the poultry-yard, the abundance present there inviting it to drink blood and eat brains, which seem to be its favorite luxuries. The rabbit is followed by the P. into its burrow, and its ravages among poultry are partly compensated by its destruction of rats.—The taming of the P. is easy if begun early: it has been trained for taking rabbits.—The skin is sold under the name *Fitch*, and is used as a kind of fur, similar but much inferior to that of the Marten (q.v.). To artists, the hair of the *fitch* or *fitchet* is well known as that of which their best brushes are made; the hairs used for this purpose being the long hairs above noticed, which grow through the lighter-colored fur of the animal.—The Ferret (q.v.) is asserted to be a tamed albino variety of the polecat.—A dark-colored kind of ferret is commonly regarded as a cross between the P. and the ferret, and is sometimes called the *Polecat-ferret*. The P. breeds in May or June, making its nest in an old rabbit burrow or similar hole, and producing four, five, or six young.—In N. America, the term P. is applied to any of the various species of SKUNK (q.v).

POLEMARCH, n. *pŏl'ē-mârk* [Gr. *polĕmos*, war; *archos*, chief, leader]: in *anc. Athens*, the third archon, who presided in the court in which the causes of the *metoikoi* or resident aliens were tried; a military officer, originally the military commander-in-chief.

POLEMIC, a. *pō-lĕm'ĭk*, or POLEM'ICAL, a. *-ĭ-kăl* [Gr. *polem'ikos*, warlike—from *polĕmos*, a battle, war: It. *polemico:* F. *polémique*]: controversial; engaged in supporting an opinion or system in opposition to others; disputative. POLEM'IC, n. a disputant. POLEM'ICALLY, ad. *-lĭ*. POLEMICS, n. plu. *pō-lĕm'ĭks*, the art or practice of disputation—applied to theology.

POLEMONIACEÆ, *pŏl-ē-mō-nĭ-ā'sē-ē:* natural order of exogenous plants, allied to *Convolvulaceæ*, and containing more than 100 known species, natives of temperate countries, and abundant particularly in n.w. America. They are mostly herbaceous, with alternate and often pinnated leaves; regular hermaphrodite flowers; 5 cleft calyx; 5-lobed corolla; 5 stamens, springing from the tube of the corolla; ovary free, surrounded with a fleshy disk; style surmounted by a 3-cleft stigma; fruit a capsule with 3 cells, and 3 valves; the seeds often enveloped in mucus which contains spiral threads. Some of the species are favorite garden flowers, as *Polemonium cæruleum*, *Cobæa scandens*, and species of *Phlox, Ipomopsis, Gilia*, etc. None are of value otherwise. *Polemonium cæruleum* is known in gardens as *Jacob's Ladder;* its stamens project from the corolla. *Greek Valerian* (*P. reptans*) is but 6–10 in. high, with flowers only ½ in. wide. It is not supposed to be really the *polemonium* of the ancients, to which great medicinal virtues were ascribed by them.

POLEMOSCOPE, n. *pō-lĕm'ō-skōp* [Gr. *polĕmos*, war; *skopĕō*, I see]: a perspective glass contrived for seeing objects that do not lie directly before the eye; an instrument for seeing without being seen, so named by the inventor, under the idea that the instrument might be useful in time of war.

POLENTA, n. *pō-lĕn'tă* [It. *polenta*, polenta—from L. *polenta*, pearl-barley]: kind of pudding made from Semolina (q.v.), or Indian corn-meal, etc.; used as food by all classes in Italy. By the poorer classes, maize is universally used. The material is mixed with milk or water, and boiled until thick enough to pour into a dish, in which it becomes as firm as a thick jelly. Cheese is grated over it, other condiments are added according to taste, and it is cut out in slices, and either eaten at once, or sometimes the slices are lightly fried in oil or butter. P. prepared from Semolina is much more expensive; many ingredients are added to suit the taste.

POLES, *pōlz:* in *geography*, the two extremities of the axis round which the earth revolves; situated therefore one on the n., the other on the s. side of the equator, and equidistant from all parts of it; or in lat. 90° n. and lat. 90° s. They are called the n. and s. poles of the earth: the n. pole is the one to which the United States is nearest. In *astronomy*, the poles, for distinction frequently denominated 'celestial poles,' are those two points, north and south, in the heavens to which the earth's axis is directed, and around which the heavens seem to revolve. The celestial poles are valuable points of reference to astronomers and geographers, so that the determination of their position in the heavens is of the utmost importance. Unfortunately, no stars mark their exact situation (see POLE-STAR)—though there is a minute telescopic star only a few seconds from the n. pole, which may be employed instead of it in rough observations: therefore it is necessary to adopt some means for discovering its precise position. This is effected in the following manner: A bright star (generally the pole-star) is selected, and its position in its upper and its lower *Culminations* (q.v.) is accurately noted; the point midway between these two positions of the star is the pole of the heavens. The observation of the star's two positions must be corrected for refraction, and it is for this reason that the pole-star is selected, since the effect of refraction is much the same in both positions of the star.—The term 'poles' has also a wider application as denoting the extremities of a line passing through the centre of a great circle perpendicular to its plane; e.g., the poles of the horizon (viz., the zenith and nadir), the poles of the ecliptic, the poles of a meridian; and in the same sense, the terrestrial and celestial poles are spoken of as poles of the equator and equinoctial respectively.—In *geometry*, pole, is used in a very indefinite sense. In *physics*, Poles are those points of a body at which its attractive or repulsive energy is concentrated: see POLARITY: MAGNETISM, TERRESTRIAL.

POLE-STAR, *pōl'stâr*, or POLARIS, *pō-lā'rĭs:* nearest conspicuous star to the n. pole of the celestial equator. The star now known as the 'pole-star' is the star α (Alpha) in the constellation Ursa Minor. Examining attentively the general movement of the stars throughout a clear winter's night, we observe that they describe circles largest at the equator, and becoming smaller and smaller toward a certain point (the n. pole of the celestial equator). close to which is the star above mentioned. This 'pole-star' is, however, a little less than 1½° from the pole, and has a small but sensible motion round it: see POLES. Because of the motion of the pole of the celestial equator round that of the ecliptic (see PRECESSION OF THE EQUINOXES), this star will in course of time (about A.D. 2100) approach to within 28′ from the n. pole, and will then recede from it. At the time of Hipparchus (B.C. 156) it was 12°, and 1785, 2° 2′ from the n. pole. Its place can easily be found in the heavens, for a line drawn between the stars α and β (called the two *pointers*, from this peculiarity) of the constellation Ursa Major, or the Great Bear, and produced northward about 4½ times its own length, will almost touch the pole-star. 2,000 years ago the star β of Ursa Minor was the pole-star; and about 2,300 years before the Christian era, the star α in the constellation of the Dragon was not more than 10′ from the n. pole; and 12,000 years after the present time, the bright star Vega in Lyra will be within 5° of it.

The s. pole of the celestial equator is not similarly marked by the near neighborhood of a bright star, the only star deserving the name of the s. pole-star being of the sixth or least visible magnitude.

POLIAN'THES: see TUBEROSE.

POLICE, n. *pō-lēs'* [F. *police*, police: It. *polizia;* Sp. *policia*, police, cleanliness—from Gr. *politei'a*, the state, system of government—from *polis*, a city]: that part of governmental superintendence which relates to internal regulations of a town, city, or state; a body of civil officers employed to enforce the laws respecting good order, cleanliness, etc. (see below). **Policed**, a. *pō lēst'*, regulated under a system of laws administered by the police. **Police officer**, or **Police'man**, one of the ordinary police; a constable. **Police magistrate**, a stipendiary judge who tries petty cases preferred by the police. **Police station**, the house to which offenders are taken in the first instance; the headquarters of the police, or of a section of them.

POLICE: civil force charged with maintaining the peace, preventing and detecting crime, and enforcing the laws. Though the word policeman is now, especially in towns, a household word, the legal denomination is that of constable.

The duties of constables or P. officers are exceedingly multifarious, and the officers receive printed regulations to guide them in the proper discharge of such duties. They have important duties in reference to the apprehension of offenders, and their powers are necessarily larger than those of private individuals. Wherever a person is seen in the act of committing a felony, it is the duty of every one, not merely of constables, to apprehend him or her without any warrant, for no warrant is needed. In case of a riot, anybody may arrest the rioter. P. officers are bound to arrest violators of municipal ordinances, e.g., unlicensed venders (where the ordinances require a license), mendicants, etc., trading without a license; and vagrants who are offending against the Vagrant Acts. The powers of P. officers are much greater than those of individuals with reference to crimes after they are committed. Thus, where the officer has not seen the offense committed, but is merely told of the fact, and he has reason to believe it, he is entitled to arrest the party charged without any warrant; he must, however, in such cases act only on reasonable suspicion. He is not justified, e.g., in apprehending a person as a receiver of stolen goods on the mere assertion of the principal felon; nor is he justified in taking a person into custody for a mere assault without a warrant, unless he himself was present at the time the assault was committed, or reasonably apprehends a renewal of it. If a P. officer have reasonable suspicion that a man has committed a felony, he may apprehend him; and so may a private individual. The difference between the authority of the P. officer and the private person in this respect is, that the latter is justified only in case it turn out that a felony was in fact committed; but the officer may justify the arrest and detention whether a felony was committed or not. It is the duty of a P. officer to raise a hue and cry in search of a concealed or escaping felon, and all private individuals are bound to join in it, otherwise they may be indicted and fined. If the party arrested be in a house in hiding, the officer may demand admittance, and if he is refused, may then break open the doors; this is so in all cases where the party has committed treason or felony, or has dangerously wounded another. An officer lawfully arresting an offender may use necessary force, but may not strike except in self-defense. In cases where the P. officer is not authorized at common law or by some statute to arrest a party without a warrant, then he must produce a warrant signed by a justice of the peace, and show it to the party if it is demanded; and if the officer happens not to have the warrant in his pocket at the time, even though it is not asked for, it is an illegal arrest. When a party is arrested, it is the duty of the P. officer to take him without any unreasonable delay before a justice of the peace or other magistrate, and meanwhile lodge him in safe custody. The party arrested must not be treated with harshness beyond what is necessary for safe custody, and therefore it has been held that a P. officer has no right to handcuff a person whom he has apprehended on suspicion of felony, unless such person has attempted to escape, or it be necessary to prevent an escape. Nor has he in general a right to search a person apprehended, unless the latter conduct himself violently.

In the United States, each city or large village usually controls its own P. force, subject to the laws of its state; in the rural districts the functions of the P. force are supposed to be discharged by constables. The details of the P. system in the several cities of the Union differ more or less, but in all essential particulars the system is identical in all. In New York city the P. dept. consists of a P. board of 4 commissioners (named by the mayor), who have full control of the force. The officers of the force are a supt., a chief inspector, 4 inspectors, captains, sergeants, and roundsmen: the body of the force consists of patrolmen: total strength of the force, 3,420 men. The number of precincts or P. subdivisions is 35, each having a station-house. There is a special squad of detectives, also a 'sanitary squad' to assist the board of health, and a squad of harbor police. The duty of the P. force is to preserve the peace, prevent crime, detect and arrest offenders, suppress riots, protect the rights of persons and property, remove nuisances in public streets and places, repress disorderly houses, arrest vagrants, enforce all laws for suppression of crime, observance of Sunday, etc. Admission to the force is regulated by the civil service law.

In England and Wales the P. force both municipal and rural is under control of the central govt., and the state contributes about half of the pay of the men, except in the 'city' of London, where the whole cost devolves on the corporations. The total strength of the P. in England and Wales (1890) was 37,957 men; proportion of policemen to pop. about 1:766; average cost per man, about $500. The total strength of the P. force of Ireland (Irish constabulary) is about 14,000 men, viz., 'Royal Irish Constabulary,' nearly 13,000 men, and 'Dublin Metropolitan P,' about 1,200; proportion of P. to the estimated pop. about 39 : 10,000. The Irish P. establishment costs about $7,500,000 a year: the force is a semi-military body; the men always go armed with sabre bayonets, and are armed also with rifles and are drilled as soldiers.—The P. force of Scotland (Scottish constabulary) numbered (1888) 4,155 men; and its cost was about $1,890,000.

POLICE, Military: term with two significations—1st, the organized body employed within an army to preserve civil order, as distinct from military discipline; 2d, a civil police with a military organization. The police of an army consists usually of steady intelligent soldiers, who act under the orders of the provost-marshal, and arrest all persons out of bounds, civilians not authorized to pass the lines, disorderly soldiers, etc.; they also attend to sanitary arrangements. As in all military matters, the police of an army possesses summary powers, and a sentence of the provost-marshal is carried out immediately after it is pronounced.

Of civil police with military organization, specimens are—the Gendarmerie (q.v.) of France, the Sbirri of Italy, and in an eminent degree the Irish constabulary. In some great cities of the United States, the police, without forming any part in the military force, are organized and governed under military rules.

POLICY, n. *pŏl'ĭ-sĭ* [Gr. *politei'ă*, the state, system of government—from *polis*, a city]: the art, manner, or system of conducting public affairs professed by a party in the state; prudence or wisdom in rulers or individuals in the management of affairs; dexterity or art in management; management of affairs: prudence. In *Scot.*, extensive pleasure-grounds around a mansion-house, originally the tract or district within which authority was exercised. Policied, a. *pŏl'ĭ-sĭd*, placed under a regular administration.

POLICY, n. *pŏl'ĭ-sĭ* [Sp. *poliza*, a policy: It. *polizza*, a note or schedule: violent corruption of the L. *polyp'tycha*, account-books, registers of taxes; Gr. *polup tuchos*, that has many folds—from *polus*, many, and *ptux*, a leaf]: contract of insurance; written contract by which a company engage to pay a certain sum in the event of death, fire, or loss, on the condition of receiving a fixed sum or percentage on the amount of the risk, or certain annual payments—such percentage being termed the *premium* (see Insurance). Policy-holder, one to whom a policy of insurance has been granted.

POLIGNAC, *po-lēn-yâk':* ancient French family, named from a castle said to have been built in the 5th c., on a rock of the Cevennes, near Puy-en-Velay, dept. of Haute-Loire, on the site of a Roman temple dedicated to Apollo, whence—according to certain rather credulous genealogists—the castle was originally called *Apollianique,* of which P. is affirmed to be only a later corruption.—The first of the Polignacs who acquired celebrity was Cardinal MELCHIOR DE P. (1661–1742), b. Puy-en-Velay, younger son of ARMAND, 16th Marquis DE P. He was educated at Paris for an ecclesiastical career, and in the negotiations of Cardinal de Bouillon with Pope Alexander VIII., 1689, the young, but astute and insinuating abbé took a principal part. In 1695; he was sent to Poland as French ambassador, when John Sobieski was dying; and diplomatized and intrigued so cunningly in favor of Prince de Conti, that the latter was actually elected his successor. Events, however, frustrated this policy, and P. lost the royal favor. In 1702—after a stroke of his usual neat flattery—he was recalled to Versailles, and rose higher into favor than ever; was named *Auditeur de Rote* 1706, and was sent to Rome. He was appointed French plenipotentiary at the Congress of Utrecht 1712; and when Louis XIV. died, was at the top of his reputation and influence. During the regency of the Duke of Orleans, he took part in the conspiracy of Cellamare, and was banished to his abbey of Anchin. 1725–32 P. had the conduct of French affairs in Rome. He was made Abp. of Auch 1726; and on his return to France, spent the remainder of his days in literary repose. He had written, about 1700, *Anti-Lucretius,* semi-metrical refutation in Latin of the skepticism of Bayle (pub. 1745). P. succeeded Bossuet at the Académie Française 1704. See C. Faucher's *Histoire du Cardinal de Polignac* (2 vols. Paris, 1772), St. Simon's *Mémoires*, and D'Argenson's *Mémoires.*

The other members of the P. family who have a historical name at all are notorious rather than noteworthy. In the reign of Louis XVI., TOLANDE-MARTINE, GABRIELLE DE POLASTRON, Duchesse DE P. (1749–1793), and her husband, JULES, Duc DE P. (1817), were among the worst, but unhappily most favored advisers of Marie Antoinette. They obtained vast sums of the public money from their royal master and mistress; and were largely, if not mainly responsible for the frightful pecuniary extravagance of the court. The discovery of the famous *Libre Rouge* occasioned the exulting cry of Mirabeau: *Mille Écus à la Famille d'Assas pour avoir sauvé l'État; un Million à la Famille Polignac pour l'avoir perdu!* The Polignacs—knowing the deep hatred felt toward them by the French people—were the first of the *noblesse* to emigrate (1789, July 16). From Empress Catharine of Russia, the duke received an estate in the Ukraine, and did not return to France at the Restoration.—He left three sons and a daughter, of whom only one has become historical—AUGUSTE JULES ARMAND MARIE, Prince DE P. (1780, May 14—1847, Mar. 29, b. Versailles). At the Restoration, he returned to France; became intimate with the Comte d'Artois, afterward Charles X.; showed ardent attachment to the Church of Rome—at least to its policy—and received from the pope, 1820, the title Prince; was appointed ambassador at the English court 1823; and 1829 became head of the last Bourbon ministry, in which capacity he promulgated the fatal ordonnances that called France to arms, and drove Charles X. from the throne. He then attempted to flee from the country, but was captured at Granville Aug. 15; was tried, and condemned to imprisonment for life in the castle of Ham, but was set at liberty by the amnesty 1836, Nov. 29. He then made his residence in England, but died at Paris.

POLISH, a. *pō'lĭsh:* of or from Poland or its people.

POLISH, n. *pŏl'ĭsh* [F. *polir*, to smooth; *polisssant*, smoothing: L. *polĭo*, I smooth]: a smooth glassy surface produced by friction or rubbing; artificial gloss; elegance of manners; refinement; substance used to impart a gloss (see DIAMOND: GRINDING: EMERY: PASTES: PUTTY-POWDER): V. to make smooth and glossy by rubbing or friction; to become smooth or glossy: to make elegant or polite; to refine. POL'ISHING, imp.: ADJ. making smooth or glossy: N. the act of making smooth or glossy; the refining of manners; smoothness; glossiness given by rubbing; a substance that polishes or is used in polishing. POLISHED, pp. *pŏl'ĭsht:* ADJ. smooth and glossy; refined; polite. POL'ISHER, n. *-ėr*, one who or that which polishes. POLISHING-IRON, a smoothing-iron; a bookbinder's tool. POLISHING-PASTE, a kind of blacking for harness and leather; a varnish for imparting a gloss to furniture. POLISH-POWDER, a preparation for brightening articles of metal. TO POLISH OFF, to finish completely, in allusion to the finishing of an article of furniture for use; to do thoroughly and for good. POLISHING OF METALS, removal of any tarnish or oxidation by means of some material which will chemically act upon it; for this purpose, sulphuric, hydrochloric, oxalic, and acetic acids are used to different metals, and in various states of dilution. Usually, it is necessary to remove the acid with clean water, and dry rapidly, to prevent re-oxidation; and then either friction with various polishing materials, or rubbing with a smooth hard surface or burnisher, brings out the lustre of the metal. POLISHING OF STONE, see STONE-CUTTING. POLISHING-SLATE, mineral used for polishing glass, marble, and metals; composed chiefly of silica, with a little alumina, lime, oxide of iron, and water; white, yellowish-white, or yellow: and of specific gravity about half that of water. It is found in Bohemia, Saxony, and Auvergne, and is supposed to be a volcanic product.

POLISH LANGUAGE AND LITERATURE: widely-spread branch of the Slavic Language and Literature (q.v.); forming (according to Dobrowsky), with the Bohemian, the w. branch. The *Polish language* surpasses almost all other Slavonic tongues in euphony and flexibility, and is scarcely excelled by any language in brevity. It does not make use of the article, but has a most elaborate declensional system, comprising seven cases. The conjugation of the verb is equally elaborate, and enables a Pole to express transitions and delicate niceties in the conditions of time and gender quite unknown to the French, or German, or English verb. The Polish vocabulary also is uncommonly rich. The number of harsh consonants in the language, it must be admitted, is large, forming a marked distinction between it and its eastern sister, the Russian, but in pronunciation, these are so much softened that its euphony is preserved. It alone of all Slavic dialects, except the old Slavic church language, has two nasal sounds; one like the French *on*, the other like the French *in*. The letter *l* has a peculiarly broad snarling sound. After the introduction of Christianity, Latin, the language of the church, exercised a powerful influence on its structure and development, and subsequent to the 14th c., it adopted into its vocabulary numerous German words. In the 16th c., Polish, as a written language, rapidly attained such perfection that it supplanted even Latin itself, until then the language of the state and of the learned. The best Polish grammars are those of Mrongovius (3d ed., Danz. 1837), Bandtke (Breslau 1824), Muczkowski (Crac. 1845), and Booch-Arkossy (1866); the most comprehensive dictionary is that of Linde, after which rank those of Bandtke (2 vols. Breslau 1806), Mrongovius (Königsb. 1835), Trojanski (4 vols., Posen 1835–46), and Liebkind (1855).

The history of *Polish literature* is divisible into five clearly marked periods.—The *first* extends from a date antecedent to the introduction of Christianity to the close of the 15th c. Of pre-Christian Polish literature, nothing has survived but some popular songs and proverbs. Among the very oldest literary monuments is a hymn to the Virgin Mary, ascribed to St. Adalbert. The introduction of Christianity paved the way for a Latin literature more or less ecclesiastico-historical. Casimir III. (q.v.), surnamed the Great, did more than any other early Polish monarch for encouragement of literature, and, among other things, founded the Univ. of Cracow, which, from the beginning of the 15th c., long continued to be the centre of intellectual life and culture in Poland. To the 15th c. belong Jan Dluglosz (Lat. *Longinus*), author of an interesting and valuable *Historia Poloniæ*, in 13 books, and otherwise worthy of remembrance as an able diplomatist and philanthropist; also Jan Laski (1457–1531), Abp. of Gnesen, whose collection of the oldest Polish laws, *Commune Inclyti Poloniæ Regni Privilegium*, is of great historical importance. In 1490 the first printing-press in Poland was established at Cracow.

The *second* period of Polish literature comprises the 16th and first quarter of the 17th c., and is marked by the use of the Polish as a written language. The reigns of Sigismund I. and Sigismund II. Augustus, are regarded as the golden era of Polish literature, properly so called. The series of poets begins with Nikol. Rej (1515–1568), commonly called the *Father of Polish Poetry*, a native of Zoravno, in 'Little Russia,' and educated at Lemberg and Cracow. He spent his life at the court of the Sigismunds. His principal works, *Wizerunek Zywota Czlowieka Poczeiwego* (Crac. 1560) and *Apophthegmata* (Crac. 1568), are full of sharp wit and strong satire, and though the language is rough and unpolished, it is poetical. After Rej, the brothers Jan and Piotr Kochanowski hold highest rank. Szymonowicz, or Simonides (d. 1629), acquired by his Latin odes the name the 'Latin Pindar;' and his *Sielanki* ('Idylls,' new ed. Leip. 1837), modelled on those of Theocritus, exhibit a charming simplicity of style. Still more original, though scarcely so graceful, are the *Sielanki* (new ed., Leip. 1836) of his friend Zimorowicz (d. 1629). Sebastian Klonowicz, called *Acernus* (d. 1608), is notable as a satirist and descriptive poet. The Reformation, which rapidly made way in Poland, being tacitly approved by the rulers and magnates, gave powerful stimulus to the intellectual and spiritual activity of the nation—visible in translations of the Bible, hymn-books, and an important pulpit or sermon literature. Among historians of this period, most famous are the brothers Bielski; Lukas Górnicki (d. 1591), author of a history of the Polish crown (*Dzieje w Koronie Polskiéj*, Crac. 1637, Wars. 1804); Strzikowski (d. 1582), whose *Chronicle of Lithuania* (Königsb. 1582) is an admirable work; and Paprocki (d. 1614).

The *third* period of Polish literature, 1650–1750, is coincident with the rule of the Jesuits, who obtained a footing in Poland about 1566, through the influence of Cardinal Hosius, soon possessed themselves of the schools, and, on the whole, seriously checked the literary and religious growth of the nation. The most conspicuous poet of this retrogressive period is the Jesuit Kazimierz Sarbievski (1595–1640), who wrote only in Latin; others more or less noteworthy are Kochowski (d. about 1700); Tvardovski (d. about 1616); Opalinski (d. 1655); Chros'cinski, translator of Lucan; Morsztyn, translator of Corneille; and Elz'sbieta Druz'backa (d. 1760). Among historians of this period, are Starovolski (d. 1656), author of *Polonia, sive Status Regni Poloniæ Descriptio* (Wölfenbuttel 1656), and other works; Kojalowicz, Jesuit (d. 1677), and Kaspar Niesiecki, Jesuit (d. 1745), whose *Korona Polska* (4 vols. Lemb. 1728–43) is the most important work on Polish heraldry.

The *fourth* period, commencing with the middle of the 18th c., and extending into the first quarter of the 19th, owes its characteristics partly to the influence of the French literature of Louis XIV.'s time; partly to the liberal patronage of literature and science by King Stanislas Augustus, the princes Czartoryski, Jablonovski, and other magnates, and the educational reforms of Stanislas Konarski (1700–73). The good work begun by Konarski was carried on by Kopczyn'ski (1735–1817), who was the first to establish on a scientific basis the grammar of the Polish language in his *Grammatyka Norodova;* by Piramowicz (d. 1801); by Bohomolec, Jesuit, who translated a multitude of stage-pieces from the French ; but above all, by Adam Stanislas Naruszewicz, accomplished translator of Tacitus; and Ignacy Krasicki (1735–1801), called the 'Polish Voltaire,' the centre of the whole Polish literature of his age, whose satires and fables are reckoned the first in his native language. As poets of this Renaissance period, occur the names of Trembecki, Cajetan Wegierski, Godebski, and Wezik. The most noted dramatist is Boguslavski (d. 1829), who wrote about 80 plays—the majority of which, under the title *Dziela Dramatzezne*, were published at Warsaw (9 vols. 1820).

The political storms that swept over Europe at the close of the 18th and the first years of the 19th c., did not quite destroy the new literary life that had burst into blossom under Stanislas Augustus. In 1801 the historian Tadeusz Czacki, Franciszck Dmochowski, and Bp. Jan Albertrandy founded at Warsaw the 'Soc. of the Friends of Knowledge,' which, especially under the auspices of the state-councilor Staszyc, bore good fruit till it was dissolved 1832, when its library of 50,000 vols. was carried off to St. Petersburg. At the same time, Jozef Maximilian Ossolinski, Hugo Kolontaj, and Stanislas Potocki, by word and writing exercised a mighty influence on the renovation of the national spirit.—The transition to this *newest* or *fifth* period was made by Karpinski (1745–1825), whose Songs and Idylls (4 vols., Warsaw 1804; new ed., Leip. 1836) live on the lips of the Polish people; by Chancellor Voronicz (1757–1829), richly imaginative poet and great orator; by Niemcewicz (1757–1841), statesman, soldier, and author of celebrity in his own land; and by the poet Kasimierz Brodzinski (1791–1835). At Wilna, which, after 1815, became the centre of Polish literary activity, and a rallying-point for all the enthusiastic spirits of the land, several young men united, with Adam Mickiewicz (b. 1798) at their head, in a crusade against the still dominant French style of literature. Some of his numerous and brilliant associates were Malczevski (1792–1826), whose best production is his epic-lyric narrative of Ukraine life, entitled *Marja;* Goszczynski (b. 1806; Poems, 3d ed., Breslau 1852); Bohdan Zaleski (b. 1802; *Poezye,* Pos. 1841, and later); Tomasz Padura (*Pienia,* Lemb. 1842); Odyniec (*Poezye,* Pos. 1833); Korsak (*Poezye,* Pos. 1833); Chodzko (*Poezye,* Petersb. 1829); Groza (*Poezye,* Wilna 1836); Lucyan Siemienski (b. 1809), excellent novelist and translator; Bielovski (b. 1806), lyric poet and translator; Gorecki, renowned for pungently sarcastic fables (*Bajki i Poezje nove,* appeared at Paris 1833); Garczynski (*Poezye,* Paris 1833); and Slowacki, most fertile of recent Polish poets. Most of these writers became either 'banished men,' or men who, while living, were forced to expatriate themselves. They belonged to the 'Polish Emigration,' whose headquarters was Paris. The most many-sided and prolific of modern Polish novelists is Jozef Ignacy Kraszevski, b.

Warsaw 1812. The new national tendency of Polish literature, which naturally first showed itself first in poetry, soon became visible in other departments also. Thus, Joachim Lelewel (b. 1786) rose to the first rank as a writer of Polish history, and a study of his works is absolutely indispensable to a knowledge of that subject; next to him (and later) in the same department stand Bandtke, Maciejovski, Count Raczynski, and Count Plater. Narbutt of Wilna wrote a very solid and comprehensive work on Lithuanian History (Wilna 1837 *et seq.*), and Lukaszewicz of Posen has furnished numerous important contributions to the history of the Reformation in Poland. A multitude of works more or less weighty have been devoted to a record of the revolution of 1830, chiefly by Polish emigrants. Into the departments of philosophy, theology, and physical science, Polish literature has entered but little.—The principal works on Polish literature are those of Muczkovski, Bentkovski, Ossolinski, Chodynicki, Lukaszewicz (Posen 1860), and the comprehensive history by Visznievski. See also the history of Polish literature in German by Nitschmann (1882); Morfill's *Russia* (1880), and the same author's excellent *Slavonic Literature* (1883).

POLISTENA, *pō-lĭs-tĕ'nâ:* town of s. Italy, province of Reggio, Calabria. The village which occupied the site of the present town was totally destroyed by earthquake 1783. Pop. 7,000.

POLITE, a. *pō-līt'* [L. *polītus*, polished, refined—from *polĭo*, I smooth: It. *polito*]: refined or well-bred in manners; polished; courteous; obliging. POLITE'LY, ad. *-lĭ*. POLITE'NESS, n. *-nĕs*. good-breeding; refinement in manners; courtesy; obliging attentions. POLITE LITERATURE, those branches of knowledge or instruction, apart from art and science, which please the understanding and refine the taste. —SYN. of 'polite': polished; refined; genteel; elegant; courteous; well-bred; affable; obliging; civil; courtly; urbane.

POLITESSE, n. *pŏl'ĭ-tĕs'* [F. *politesse*—from It. *politez'za*, politeness, elegance]: over-acted politeness, used in contempt.

POLI'TIANUS (or POLI'TIAN), ANGELUS: see POLIZIANO, ANGELO.

POLITIC, a. *pŏl'ĭ-tĭk* [F. *politique*, political—from L. *poli'tĭcŭs;* Gr. *politĭkos*, of or belonging to civil polity or to the state—from *polis*, a city: It. *politico*, cunning, political]: wise, prudent, and discreet in the management of public affairs; well-devised, and adapted to promote the welfare of the state; judicious; artful; cunning; crafty. POLITICS, n. plu. *pŏl'ĭ-tĭks*, art or science of conducting the affairs of a kingdom (see below): system of management of public affairs adopted by a party: in a narrower sense, the contest of parties in a state for power in the management of its affairs. POLITICAL, a. *pō-lĭt'ĭ-kăl*, pertaining to the civil government of a state and its administration—derived from an office under government, or from some connection with it; treating of politics or government. POLIT'ICALLY, ad. *-lĭ*, in relation to the public administration; in a political manner. POLITICIAN, n. *pŏl'ĭ-tish'ăn*, a man skilled in politics, or who devotes himself to them. POL'ITICLY, ad. *-tĭk-lĭ*, in a politic manner; artfully; cunningly. POLITY, n. *pŏl'ĭ-tĭ* [Gr. *politeia*, system of government]: the form or constitution of the civil government of a country; the general principles that regulate the conducting of public affairs.—SYN. of 'politic': prudent; wise; artful; cunning; discreet; sagacious; provident; wary.

POLIT'ICAL ECONOMY: science of public welfare, as that welfare is affected specially by governmental administrations in physical concerns—e.g., in labor, trade, capital, rental, money, credit, value of product, competition, etc., though, as by the above definition, P. E. concerns itself chiefly with material interests, it cannot—in dealing scientifically with the material welfare of such a being as man—exclude all reference to his moral and spiritual activities. A discussion, to be scientific, must take into account all elements that bear forcibly on the question: hence much that has been advanced on P. E. has at its beginning forfeited its claim to science by reducing man to a machine—known as the 'economic man.' As no such creature is known as really existing, P. E. need not discuss his welfare.

The word economy from the Greek for house-law or house-regulation, refers to the material portion of domestic regulation, and does not etymologically embrace, e.g., the observance of religion or the communication of instruction. The most important part of it, in this use, is the adjustment of the expenditure of the household to the income at their command. The term 'Political' came to be used with it as a convenient method of expressing the application to a state of a sound system of management in relation to its affairs. In later times, however, the word, as applied to a community, has taken larger and deeper application. P. E. now means, not merely the art of regulating communities in their financial and other material affairs, but also the science of those laws which Providence has established for their regulation in all their material interests. The income and expenditure of the govt., as apart from that of the people of the community, are of course under regulation like those of a household; but these form a department in P. E., called Finance (q.v.). It is evident that on a field so vast and so diversified with complex interests, there is likelihood of the formation of parties of theorizers on various separate lines. This has been the fact. The divisions mostly have been casual rather than scientifically developed; though there is a claim to a scientific development of P. E. now prominently made by advocates on both sides of the question whether govt. shall positively regulate the proceedings of the people in all or any of their leading physical interests (see the definition at the beginning), or instead shall trust to the great natural laws (supply and demand, etc.) to bring to bear through individual action all needful regulation. Thus, for illustration, if any were to advocate the utmost extreme of Free Trade (not that any party really does this), such advocates might give P. E. what they would deem a scientific development in the direction of trusting all to general natural laws; while at the other extreme Socialists (see SOCIALISM), and still further Communists (see COMMUNISM), actually tend to give P. E. what they deem a scientific development in the direction of putting no faith in great natural laws, but ordering all by governmental control. It is not the province of this work to decide between these two; yet it is permissible to suggest that P. E. may find a development equally scientific, on the principle that the great general laws—and equally the specific governmental control—will do their best work in a given case when each is combined with or balanced against the other, according to the special requirements of the case in hand. —For further discussion of various departments or relations of P. E., see the following titles (also the cross-references under some of them): ATELIERS NATIONAUX: BOUNTY: BANK—BANKING: CAPITAL: COLONY: COMMUNISM: COMPETITION: CONSUMPTION (in Polit. Economy): CO-OPERATION: CORN-LAWS: CREDIT: DEMAND AND SUPPLY: EXCHANGE: EXCISE: FARMERS' ALLIANCE: FINANCE: FOURIERISM: FREE TRADE: INTERNATIONAL WORKING MEN'S ASSOCIATION: LABOR: MACHINERY, POLITICAL ECONOMY OF: MONEY: MONOPOLY: NAVIGATION LAWS: RENT: REVENUE, PUBLIC: PROFIT SHARING: SLAVERY: SOCIALISM: TAX ON LAND, SINGLE: TARIFF, PROTECTIVE: TRADE-UNION: TRUSTS: VALUE.

POLITICAL OFFENSES: crimes considered injurious to the safety of the state, or involving violation of the allegiance due by a citizen or a subject to the supreme authority of the state.

By the Roman law, in the early times of the republic, every act injurious to the state was comprehended under the name *perduellio,* and visited with death. That term included conspiracy against the govt., aiming at kingly power, aiding the enemies of Rome, and losing an army. The word *perduellio* afterward fell into gradual disuse, and the chief state offenses were known by the term *majestas,* or *crimen læsæ majestatis,* somewhat akin to the treason of modern times. In the republican period, the crimes to which the epithet *læsa majestas* was most frequently applied, were the betrayal or surrender of an army to the enemy, the excitement of sedition, and such a course of administration as impaired the dignity of the state. In imperial times, acts and words disrespectful to the reigning emperor were included, and an indignity to his statue was visited almost as severely as an offense against his person. *Læsa majestas* was generally punished with death, confiscation, and infamy. The criminal might even be tried after his death, to the effect of confiscating his property, and rendering his memory infamous—a practice to which resort was had in France and Scotland as late as the beginning of the 16th century.

In modern times, the acts brought under the category of P. O. have varied much at different periods and in different countries. They have in general been dealt with more leniently under constitutional than under despotic governments. It is, however, a principle which has been generally recognized by the most constitutional of governments, that when the legislature thinks itself endangered by a secret conspiracy against the state, or an understanding with the enemies of the country, it permits the executive, for a limited time, to arrest suspected citizens, without the formalities required in ordinary circumstances.

In England, a large number of the graver P. O. are included under the denomination Treason; and the treason law has sometimes been stretched to include offenses which by a fair construction could hardly come within it, such as the use of violence to reform religion or the laws, or to remove the councilors of the sovereign. Even riotous assemblies with the object of destroying all property of a particular class have been held treason. P. O. include also a number of crimes against govt. falling short of treason, and passing under the name Sedition, which, though they have for their ultimate object the violation of the public peace, do not aim at direct and open violence against the laws or the sovereign, but rather the dissemination of a turbulent spirit tending to produce such violence. The British govt. does not permit the political offenders of other countries to be included in extraditional treaties; and in modern times, generally speaking, extradition does not apply to political offenders; contrary to the doctrine laid down by Grotius. In some countries, conspiracy against the sovereign of any country in league with the state is a special offense; in Great Britain, however, this seems not to be the case.

In the United States the only political offense recognized by the federal constitution is treason, which (art. III. sec. 3) is defined to 'consist only in levying war against' the United States, 'or in adhering to their enemies, giving them aid and comfort.' Hence it is not treason to assassinate the president, while in a monarchical govt. the slaying of the head of the state, or even the attempt to slay, is always *crimen læsæ majestatis.* The United States have never extradited persons charged with P. O. against foreign govts., who may have taken refuge in this country. But if the act of treason were the assassination of a sovereign, the assassin would doubtless be extraditable if an extradition treaty covering the case of wilful murder existed between the two governments.

POLITICAL PARTIES, French: see France (Political Parties).

POLITICAL PARTIES IN THE UNITED STATES: associations for maintaining or advancing some specific principles of government or methods in public administration. After the Revolution, in the discussions which introduced the league of the states in 1777 (see CONFEDERATION OF THE THIRTEEN AMERICAN COLONIES), and thereafter through 12 years' till the Constitution of the United States (q.v.) went into effect, political opinion was crystallizing at two opposite points, representing the two principles which have continued as the main elements of two opposite political parties ever since. These two principles—one, that of a strongly centralized national government, the other, that of a wide range of independent local action for every several state—must by the very nature of our system be abiding as balancing elements of political party action.

The two factions in the constitutional convention of 1787 were known by the names FEDERALISTS and ANTI-FEDERALISTS—the first wishing a consolidated representative republic; the second wishing no federal government whatever, but only an established league of independent republics. The anti-federal lines however were not clearly drawn; and the constitution actually established a powerful republican nationality. On both sides there were concessions—each side, but more largely the Anti-federalist, expecting future advantage by dint of putting on the terms of the new constitution a construction in accord with its own views. The Anti-federalists were conciliated by the adoption of the first ten amendments to the constitution (1789). Among the important applications of the national power which have, with varying consistency from time to time, been advocated by broad constructionists (e.g., the Federalists and their successors the National Republicans of 1827–34, the Whigs, and the Republicans since 1856), while questioned or quite disallowed by strict constructionists (e.g. the Anti-federalists, and their successors the Democratic Republicans or Republicans of 1792–1828, and the Democrats since 1828), are: the use of national funds for certain great classes of internal improvements; the exclusion of human slavery from the territories; the abolition of slavery in the states; the military coercion of a state in rebellion; the administration of a federal banking system; the imposing of a tariff on foreign imports for protection of American products from foreign competition. A protective tariff was enacted in the first congress, 1789, with little debate—party lines on that subject not having then been defined; but Hamilton's proposal that the federal government should assume the debts incurred by the several states in the Revolution, as also his proposal of a national bank, met instant opposition from the Anti-federalists, and passed only by a close vote.

At the end of the second congress, 1792, the hitherto loose Anti-federalist organization became more definite. Among the Federalist leaders were Washington (q.v.), John Adams (q.v.), Alexander Hamilton (q.v.), John Jay (q.v.), Jonathan Trumbull (q.v.); among Anti-federalists, Thomas Jefferson (q.v.), Edmund Randolph (q.v.), George Clinton (q.v.). The French revolution of 1789 excited in this country a general admiration and sympathy, which at least for a time, gave new strength to the Anti federalist sentiment. This growing sentiment, led by Jefferson, embodied itself about 1792 as the DEMOCRATIC-REPUBLICAN party—this name being afterward abbreviated in ordinary use to REPUBLICAN through about 36 years till 1827 or 28, since which date the party has been known by its present (1896) name DEMOCRATIC. In the first contested election, (1796) the Federalists elected their candidate, John Adams, by a small majority, but their power was waning. They were stigmatized by their opponents as the party of aristocracy and the English party. With the end of the war of 1812 (see UNITED STATES—*History*) with England—a fruitless war against which the Federalists as a party had protested—they became practically extinct (1815), though in 1816 they made one more nomination for the presidency and carried 3 of the 19 states. After that campaign they disappeared, uniting with elements that had been gradually developed in the bosom of their old opponents, the Republicans (i.e., Democrats), to form a new party under the lead of Henry Clay (q.v.). This new party ultimately became known as WHIGS (see below). The beginning of the Federalist decline near the close of the 18th c. may be traced to the unsatisfactory and complicated state of our foreign relations. The country was still weak and poor, and both England and France were alike disregardful of its rights. Jay's treaty with England, signed by Washington, 1795, not as desirable but as the best that could then be attained, was stigmatized as evincing Federalist subserviency to that country which was still allowed to continue its impressment of American seamen and its harassment of American commerce. Meanwhile the new Republic of France was aiming to influence American politics in favor of the Republicans (i.e., Democrats) by actual threats. The great French grievance was Jay's treaty with England (see UNITED STATES—*History*). The insolence of France at length aroused a war spirit in this country; ministers were reciprocally dismissed or recalled, treaties annulled, and in 1797–8 several actual naval conflicts occurred, though war was not formally declared. This condition of affairs brought a strong re-action of public favor to the Federalists, the old opposers of the French; and they probably might have regained their control of the government had they not been fatally misled into passing laws in 1798, such as the Alien Law and the Sedition Law (see ALIEN AND SEDITION LAWS), which strained the federal power beyond all limits, and laid them open to the charge by their opponents of infringing the personal liberty guaranteed by the constitution. Thus they lost the popular favor which they had recently regained. Further weakness resulted, 1799, from the breach between their two leaders, President John Adams and Alexander Hamilton They never elected another president.

Returning to glance at the early Republican (i.e., Democratic) party, we observe them in 1794 voting for direct taxation, as against the Federalist indirect; in 1798 meeting the Federalist alien and sedition laws with what has been termed 'the first authorized proclamation of the strict constructionist party'—the Virginia and Kentucky resolutions; whose meaning was essentially Nullification, and in 1801 opposing any currency except gold and silver. All this was characteristic. It is noticeable, however, that the Federalist and the Republicans (i.e., Democrats) exchanged principles somewhat in regard to the war of 1812—Federalists protesting against its methods as infringing state-rights under a strict construction of the constitution, while Republicans (i.e., Democrats) upheld those methods under a broad construction. Generally, however, the lines were definitely drawn on this principle; and even in Monroe's second election and presidential term (1820–25), there were in the one nominal party actually evident two parties, Strict and Broad constructionists. There was also the beginning of a sectional division, northern and southern, on Slavery: see MISSOURI COMPROMISE.

Of the strict constructionists of that period the leaders were John C. Calhoun (q.v.) of S. C., William H. Crawford (q.v.) of Ga., and Andrew Jackson (q.v.) of Tenn.; of the broad constructionists, Henry Clay (q.v.) of Ky. and John Quincy Adams (q.v.) of Mass. Of these two groups in the Republican (i.e., Democratic) party, the former began to be spoken of about 1826 as 'Jackson men;' and the latter, about 1827 as NATIONAL REPUBLICANS. The former generally opposed, the latter uniformly advocated, systematic public improvements at national expense and a protective tariff. The Jackson men soon becoming a national party, took the name DEMOCRATS, by which their party has since been known; the National Republicans (about 1834), after continual re-enforcement by the Anti-Jackson men among the old Republicans (i.e., Democrats), took the name WHIGS.

In the campaign of 1828, Jackson (Dem.) was elected over John Quincy Adams (National Rep., nominated for a second term). Jackson received 178 electoral, and 687,502 popular votes; Adams, 83 electoral, and 509,097 popular votes. In 1830 a faction of the National Republicans, organized as an ANTI-MASONIC party in N. Y. after the mysterious disappearance in 1826 of William Morgan (q.v.), displaced the National Republicans in that state, nominated William Wirt for the presidency, receiving the 7 electoral votes of Vt. 1832, and elected its candidate gov. of N. Y. 1835. It was absorbed by the Whigs about 1840. The WHIG party made five presidential nominations, 1836, 40, 44, 48, 52. It elected William Henry Harrison (q.v.) 1840; and Zachary Taylor (q.v.) 1848. In the election of 1848 the electoral vote was, Taylor (Whig) 163; Cass (Dem.) 127; popular vote, Whig 1,360,099; Democratic 1,220,544; Free Soil 291,263. The next presidential campaign, 1852, was the expiring effort of the Whig party: its electoral vote was 42, for Winfield Scott (q.v.); its popular vote 1,386,578. The Democratic electoral vote, for Franklin Pierce (q.v.), was 254; popular vote 1,601,480. The question of slavery extension had suddenly become acute and controlling; and while the Democratic party was gradually tending to a pro-slavery position and thus attracting large numbers of pro-slavery Whigs, the Whig party, holding to a compromise policy, had distinctly refused an anti-slavery position, and thus failed to receive any compensating gains. The anti-slavery men among the northern Whigs, quitting their party, acted for a time with the Free Soil Democrats (see below), or declared themselves 'Anti-Nebraska Men' (the nucleus of the party which in 1856 became organized as 'Republicans'), or joined the new American Party (popularly called 'Know-Nothings'). The southern Whigs kept the party name a little longer, but were soon absorbed by the Democrats.

Three minor parties which had a brief existence at this period are here to be noticed.—The Liberty Party, the first political organization of pronounced abolitionists, was organized 1839; and in 1844 it cast a vote of 62,300 for James G. Birney (q.v.). In 1848 and 52 it mostly voted with the Free Soil party, and in 1856 was one of the elements which united to form the new Republican party (see below).—The Free Soil Democrats or 'Free Soilers' originated in 1848 in a split in the Democratic party in N. Y. Two contesting delegationswere sent to the national Democratic convention—one, the conservatives, familiarly called 'Old Hunkers,' who opposed action by the federal government for either restricting or extending slavery; the other, the Free Soil men, familiarly called 'Barnburners' (in reference to the man who, to rid his barn of rats, burned it down), whose principle was opposition to any further extension of slave territory. The Free Soil men, finding the Democratic party averse to their principle, withdrew, and formed part of a national convention for organizing the Free Soil party at Buffalo, Aug. 9, which declared against any admission of slavery into new states or territories, and which nominated for the presidency Martin Van Buren (q.v.) of N. Y., and for the vice-presidency Charles Francis Adams (q.v.) of Mass. This party's popular vote, 291,263, gained no electoral vote. In its second national convention, 1852, it repudiated the 'Omnibus Bill' (see Compromise Measures of 1850), denounced the Fugitive Slave Law (q.v.), and nominated for president John P. Hale (q.v.) of N. H., and for vice-pres. George W. Julian of Ind. These candidates received 155,825 popular, but no electoral vote. This Free Soil party in 1854 strongly opposed the Kansas-Nebraska bill (see Kansas—*History*) in alliance with the Anti-Nebraska men, and with them finally (1856) became a constituent of the present Republican party.—The American party, familiarly called 'Know Nothings' (q.v.) because of the secrecy of its earlier methods, arose about 1852. It was a revival of the transient and local 'Native American' parties of 1835 and 43: and was based on opposition to foreign influence, and on a suspected interference of the Rom. Cath. Church in politics. It demanded 21 years' residence in order to naturalization. It had at times considerable anti-slavery and general reform element, but gathered a diverse constituency, and was joined by many southern Whigs after the wreck of the Whig party. In 1855 it carried the elections in 9 states. In 1856 it nominated for the presidency Millard Fillmore (q.v.) of N. Y., and Andrew J. Donelson of Tenn.: this ticket received 8 electoral votes and its popular vote, 874,534, was between a fourth and a fifth of the total cast by all parties. This was its only appearance on the national field; in the next presidential campaign (1860) the great body of its members took the name 'Constitutional Union' party (see below). A revived (small) American party appeared in four campaigns, 1876 to 88.

The REPUBLICAN party, which since 1860 has held the govt. except for 8 years, came into existence in 1856, and took its full development four years later in answer to a logical demand for a broad constructionist party for necessary dealing with the slavery question. The Democratic party had become an agency of the slave power since its principle of strict construction of the constitution had been found available to prevent any interference with the extension of slavery. On the other hand, the Republicans, while proposing to respect the full constitutional rights of slavery where it existed, had not the least scruple in using the national power for preventing its extention to new territories which were the national property. Abolition was not intended: the nation's peace, security, and prosperity, were the objects proposed. Nor had the Republicans any scruple against the nation's saving the Union, which was the very body of the national life, by co-ercing a seceding or rebellious state. Abolition, when it came, was not an act of civil law, but of military power. Others of the Republican principles need not be here repeated; they were such broad construction principles as have been indicated in the early pages of this article. The Republican party in its first presidential campaign (1856) nominated John C. Fremont (q.v.) of Cal., and William L. Dayton of N. J. The Democratic party nominated James Buchanan (q.v.) of Penn., and John C. Breckinridge of Ky. The Democrats were successful; the electoral vote stood, Democratic 174; Republican 114, American 8. The popular vote stood, Democratic 1,838,169; Republican 1,341,264; American 874,534.

The memorable campaign of 1860, the preface to the war of secession (see UNITED STATES—*History*), was contested by four parties. The Democratic convention at Charleston, S. C., Apr. 23, adopted the Douglas platform of Popular Sovereignty, which allowed the people of a territory to decide on the admission or exclusion of slavery there, but which also declared the right of the supreme court to give a decision. Thereupon, many southern state delegations withdrew. The remaining delegates, finally, at Baltimore nominated Stephen A. Douglas (q.v.) of Ill. for pres., and Herschel V. Johnson of Ga., for vice-pres.—The seceding Democrats organized a new convention, and adjourned to meet in Richmond, Va., June 11; thence they adjourned to meet at Baltimore, June 28, where they nominated John C. Breckinridge of Ky. for pres., and Joseph Lane of Ore. for vice-pres.: their platform declared the right and avowed the full purpose to extend slavery into all the territories.—The Constitutional Union party (in great part the same as the old American or 'Know Nothing' party) in convention at Baltimore, May 19, declared for peace, the constitution, and the union of the states, utterly evading the slavery question; they nominated for pres. John Bell (q.v.) of Tenn., and for vice-pres. Edward Everett (q.v.) of Mass.—The Republican party in national convention at Chicago, May 16, adopted a vigorous platform denouncing the Democrats for their administration on the slavery question and for their threats of disunion, declared the duty of congress to prevent slavery from entering the territories, and pronounced in favor of a protective tariff: they nominated for pres. Abraham Lincoln (q.v.) of Ill., and for vice-pres. Hannibal Hamlin (q.v.) of Me.—The Republicans were successful, their electoral vote being 180, against 12 for the regular or Douglas Democracy, 72 for the seceding or Breckinridge Democracy, and 39 for the Constitutional Union party. The popular vote was: Lincoln 1,866,452; Douglas 1,375,157; Breckinridge 848,133; Bell 590,631. Secession followed, with the formation, 1861, Feb., of the *Confederate States of America* (see UNITED STATES—*History*), which recognized slavery and forbade any tariff for protection: Jefferson Davis (q.v.) of Miss. was chosen pres., and Alexander H. Stephens (q.v.) of Ga. was chosen vice-pres. The Confederate States opened civil war by firing on Fort Sumter, 1861, Apr. 13.

In the campaign of 1864, the Republicans renominated Abraham Lincoln for pres., and nominated Andrew Johnson (q.v.) of Tenn. for vice-pres. Their platform demanded continuance of the war till the rebel armies had unconditionally surrendered. The Democrats nominated George B. McClellan (q.v.) of N. J., and George H. Pendleton of Ohio. Their platform declared the war a failure and called for cessation of hostilities. The Republicans were successful: electoral vote, Lincoln 212; McClellan 21; popular vote, Lincoln 2,330,552; McClellan 1,835,985. The assassination of the president, 1865, Apr. 14, brought Andrew Johnson (q.v.) to the presidency. The last rebel armies surrendered. A bitter contention soon sprang up between Pres. Johnson (a strict constructionist) and the Republican majority in congress concerning the proper policy for reestablishing in the Union the states that had seceded, and the due steps for protection of emancipated slaves in their newly granted rights. It was again the old question between broad and strict construction, between Federal sovereignty and state-rights—the first theory asserting the full power of congress to appoint rules for re-admission of the seceded states, the second theory denying it. Congress prevailed; but its impeachment of the pres. failed to bring a verdict of condemnation and dismissal from office.

In 1868 the Republicans elected Ulysses S. Grant (q.v.) and Schuyler Colfax, (q.v.) by an electoral vote of 214, and popular vote of 3,012,833; against the Democratic nominees, Horatio Seymour (q.v.) and Francis P. Blair, (q.v.) whose electoral vote was 80 (or 71 without Ga.), and popular vote 2,703,249. In 1871, Pres. Grant, under authorization by congress, made a beginning in the civil service reform.

In 1872 a LIBERAL REPUBLICAN party organized in Mo., spread to other states and in convention at Cincinnati, May 1, adopted a platform urging the relief of the states lately in revolt from what was deemed undue restraint by the federal government. Horace Greeley (q.v.) of N. Y. was nominated for pres., and B. Gratz Brown (q.v.) of Mo. for vice-pres. These candidates, with the platform, were adopted by a nearly unanimous vote in the Democratic national convention, June 9. A few 'strait-out' Democrats revolted, and nominated (Sep. 3) Charles O'Conor (q.v.) of N. Y., and John Quincy Adams (q.v.) of Mass.—The Republicans unanimously renominated Pres. Grant, with Henry Wilson (q.v.) of Mass. as vice-pres.—The Republican ticket was elected by an electoral vote of 286 against 63, and popular vote of 3,597,132 against 2,834,125 (29,489 being for O'Conor.)

By 1875 the Republican party in the south, had, except in three states, practically lost all power—the negroes being unable to maintain their rights as voters. The Republican governors of several southern states were frequently reporting lawless violence, and calling on the president to support them with soldiers. Meanwhile, at the north also the political tide was turning, and the Democrats gained a majority in the house of representatives. The Republican nominees in the presidential campaign of 1876 were Rutherford B. Hayes (q.v.) of O. and William A. Wheeler (q.v.) of N. Y.; the Democratic, Samuel J. Tilden (q.v.) of N. Y., and Thomas A. Hendricks (q.v.) of Ind. A new party suddenly appeared, the INDEPENDENT, usually called the 'Greenback' party, opposing the resumption of specie payments, and calling for the issue as currency of U. S. notes ('Greenbacks') convertible into bonds on demand: it nominated Peter Cooper (q.v.) of N. Y. for pres. A NATIONAL PROHIBITION party cast a vote of 9,522. The result of the voting was uncertain: the popular vote probably was, Rep. 4,033,811; Dem. 4,285,-992; 'Greenback' 82,634: the undisputed electoral vote was Republican 172, Democratic 184; while 13 electoral votes (12 southern) were in dispute. Congress, after a long and menacing debate, appointed an Electoral Commission (q.v.), which decided that the 13 disputed votes belonged to the Republican list, and thereupon Hayes and Wheeler were declared elected. During Pres. Hayes's term, the act passed four years previously, ordering resumption of specie payments, took effect, 1879, Jan. 1, without difficulty, though it had been steadily decried by the Democrats as impracticable.

In the presidential campaign of 1880 the Republican convention, after many ballots in which 306 votes were cast steadily for Gen. Grant, nominated James A. Garfield (q.v.) of O., and Chester A. Arthur (q.v.) of N. Y. The Democratic convention nominated Winfield S. Hancock (q.v.) of Penn., and William H. English of Ind., and set forth a strict construction platform. The former Independent, non GREENBACK-LABOR party, nominated James B. Weaver (q.v.) of Ia., and B. J. Chambers of Tex. on a platform which condemned all issue of money except by government, and denounced land-grants to railroads. This was the forerunner of the POPUSISTS (see below). The National Prohibition party also made nominations. The Republican ticket was elected—the electoral vote standing, Republican 214; Democratic (with Ga.) 155: popular vote, Republican 4,454,516; Democratic 4,444,952 Greenback 308,578; Prohibition and scattering, 12,576.—On the death of Pres. Garfield 1881, Sep. 19, Vice-Pres. Arthur took his place.

In the presidential campaign of 1884 the Republican nominees were James G. Blaine (q.v.) of Me., and John A. Logan (q.v.) of Ill. To these nominations many prominent Republicans were intensely opposed; and under the lead of Carl Schurz, George W. Curtis, and others, a conference of 'Independents' was assembled in New York which publicly rejected the party nominees, and later pronounced for the Democratic candidates. This faction, familiarly called 'Mugwumps,' was the beginning of a division in the party which caused the election (twice) of the only Democratic president since the civil war.—The Democrats nominated Grover Cleveland (q.v.) of N. Y., and Thomas A. Hendricks of Ind.—The 'Anti-monoply' party, a Democratic faction, nominated Benjamin F. Butler (q.v.) of Mass., in which nomination the 'Greenback-Labor' party joined—the combination being called the PEOPLE'S party.—The Prohibition party also made nominations, and showed growing strength.—The Democrats (through their majority of about 1,100 in N. Y.) were successful by an electoral vote of 219 against 182 Republican; popular vote, Democratic 4,874,986: Republican 4,851,981; People's 175,370; Prohibition 150,369

In the presidential campaign of 1888 the Republican nominees were Benjamin Harrison (q.v.) of Ind., and Levi P. Morton (q.v.) of N. Y. Mr. Blaine, though urged, had declined to allow his name to be brought before the convention.—The Democrats renominated Pres. Cleveland (for a second term), and Allen G. Thurman (q.v.) of O.—The Prohibition party nominated Clinton B. Fisk (q.v.) of N. J., and John A. Brooks of Mo.: their platform also favored woman suffrage.—The UNION LABOR party, a combination of the 'Greenbackers,' the Farmers' Alliance, and members of the Knights of Labor and similar organizations, nominated Alson J. Streeter of Ill., and Charles E. Cunningham of Ark. The platform called for issue of currency direct to the people and not through banks, free coinage of silver, postal saving-banks, a graduated income-tax, woman suffrage, and various other reforms, and denounced the issue of interest-bearing bonds. —Among minor parties was the UNITED LABOR party, supporting in a few states the principles of Henry George (q.v.).—The Republicans (carrying N. Y.) were successful by an electoral vote of 233 against 168 Democratic. The popular vote, showing enormous Democratic majorities in southern states, was: Republican 5,440,708; Democratic 5,536,242; Prohibition 249,506; 'Union Labor' 146,935.—During this administration the McKinley tariff was enacted.

In the presidential campaign of 1892, the Republican nominees were Pres. Benjamin Harrison (for a second term), and Whitelaw Reid (q.v.) of N. Y.—The Democrats again nominated Grover Cleveland of N. Y., and Adlai E. Stevenson of Ill.: the platform denounced the McKinley tariff as robbery of the many for the benefit of the few.—The PEOPLE'S party (see above, 1880–84), afterward called 'Populists,' nominated James B. Weaver (q.v.) of Io., and James G. Field of Va.: the platform, a fierce denunciation of both the old parties and of nearly all present business and social conditions, was similar to that of the Union Labor party of 1888.—The Prohibition party nominated John Bidwell of Cal., and James B. Cranfill of Tex.: the platform declared also for woman suffrage and some other reforms.—A minor party was that of SOCIALIST LABOR.—The Democrats were successful by an electoral vote of 277, against 145 Republican and 22 People's: popular vote, Democratic 5,554,685; Republican 5,172,333; People's 1,040,600; Prohibition 270,314; Socialist Labor 21,191. In five northwestern states the Democrats voted for the electoral ticket of the People's party.—During this administration the Wilson tariff was enacted.

In the presidential campaign of 1896 Republican success was at first generally expected, as the poor results from the Wilson tariff had caused overwhelming Republican gains in the last congressional elections. But an unexpected element was introduced when the action of the Chicago convention revealed the fact that the Democratic party had become practically a Populist organization. Both parties were seen to be in close fusion against the Republicans.—The Republican convention at St. Louis, June 17, nominated William McKinley (q.v.) of O., and Garret A. Hobart of N. J. The platform adopted by a vote of 812½ to 110½, declared as heretofore, for international bimetallism; but also declared the free coinage of silver by this country alone to be utterly inadmissible as involving repudiation and dishonesty, with general financial ruin in which the workingman would be the first and greatest sufferer. With the maintainance of the gold standard it pronounced also for the principles historic in Republican policy.—The Democratic convention met at Chicago, July 7, and by a two-thirds vote nominated William J. Bryan of Neb., and Arthur Sewall of Me. Its platform declared for the free and unlimited coinage of silver at the ratio of 16 to 1; 'we favor such legislation as will prevent for the future the demonetization of any kind of legal tender money by private contract;' it denied the right of the U. S. govt. to interfere for upholding U. S. law against popular resistance in a state except on application by the governor of the state; and looked forward to such a reconstruction of the U. S. supreme court as should reverse the recent decision against the constitutionality of the income tax.—The Populist convention afterward at St. Louis, also nominated William J. Bryan (Dem.) for pres., with Thomas E. Watson (Pop.) for vice-pres.—The 'Silver Party' met in the same city at the same time and nominated the Democratic candidates, Bryan and Sewall.—The Prohibition party nominated Joshua Levering of Md., and Hale Johnson of Ind.—The Socialist Labor party nominated Charles H. Matchett of N. Y. for pres.

An immense number of Democrats, some of great prominence, immediately and publicly declared themselves against the Democratic platform and ticket: while from the Repubcan party, especially in the west, there were some noticeable desertions of those favoring free silver. A call was issued for those Democrats in every state who opposed the action of the Chicago convention, to send delegates to a 'National Democratic Convention,' which met at Indianapolis September 2d, and nominated Gen. John M. Palmer (q.v.) of Ill. for pres. and Gen. Simon B. Buckner of Ky. for vice-pres., on a platform declaring for the single gold standard, tariff for revenue only, and retirement of govt. paper money. No election campaign since the civil war has been attended with such excitement.

POLITICAL PARTIES.

The Republicans were successful by an electoral vote of 271 against 176 Democratic: popular vote, Republican 7,104,779, Democratic 6,502,925, Prohibition 132,007, National Democracy 133,148, Socialistic Labor 36,274. McKinley and Hobart were given a popular plurality of 601,854, which, with the exception of Grant's plurality of 762,991 over Greeley (1872) had never been exceeded in the history of national elections. McKinley was the first candidate since Grant to receive an absolute majority of all the votes cast—286,452. He carried 23 states, comprising all the New England States, the Middle States, and the Central West (the area of fiercest struggle), besides Md., Ky., and W. Va., of the southern border, Wis., Minn. and N. Dak. of the northwest, and Ore. and Cal. of the Pacific coast. This area includes about two-thirds of the total population and three-fourths of the wealth of the country. Bryan carried a compact area of 22 trans-Mississippi and southern states. This election marked the first decisive breach in the 'solid South.' Throughout the campaign the situation in the South was much complicated by the union of populists and democrats in favor of Bryan, and the nomination of two vice-presidential candidates, each of whom refused to retire in favor of the other. Although Bryan carried the entire south apart from the four border states, Del., Ky., Md., and W. Va., his majorities in that section were much smaller than those cast for the democratic candidates in the four preceding presidential elections. Many leading southern papers which supported Bryan afterward declared that there was small encouragement to contest another campaign on the free-silver issue, on which so decisive a verdict had been rendered. Notwithstanding the Republican success, it is surprising to note how small a change in the votes, if properly distributed, might have given the victory to Bryan. A change of 48 electoral votes would have given him the necessary majority, and this could have been accomplished by a turn-over of about 30,000 votes in 6 states—Ind., Ky., Cal., Del., Ore., and W. Va.

In the campaign of 1900 the Republicans were successful by an electoral vote of 292 against 155 Democratic; popular vote, Republican 7,208,224, Democrat 6,358,789, Prohibition 208.333, Social Democratic 86,686, Social Labor 39,759, Middle of the Road Populist 50,373, total popular vote 13,961,566. McKinley and Roosevelt were given a plurality of 871,513, an increase of 268.958 over 1896. Kansas, Nebraska, South Dakota, Utah, Washington and Wyoming, which had cast their electoral votes for Bryan in 1896, returned to the Republican column; in Nebraska, Bryan's own state, the union of Democrats, Populists and Silver Republicans failed to carry the election; but Kentucky, which had voted for McKinley in 1896, now gave her vote to Bryan. A large number of Democrats voted for McKinley, although they disapproved of his Philippine policy. On the other hand, many independent voted for Bryan on account of the issue of "imperialism."

POLITICO-, prefix, *po-lĭt-ĭ-kō-* [Eng. *politics*]: political.

POL'ITICS: branch of combined ethics and economics which has for its subject the proper mode of governing a state, so as to secure its prosperity, peace, and safety, and to attain as perfectly as possible the ends of civil society. Among the subjects which P. embraces are the principles on which government is founded, the hands in which the supreme power may be most advantageously placed, the duties and obligation of the governing and governed portions of society, the development and increase of the resources of the state, the protection of the rights and liberties of the citizens, the preservation of their morals, and the defense of the independence of the state against foreign control or conquest. While the philosophy of governing constitutes the *science* of P., the *art* of P. consists in the application of that science to the individual circumstances of particular states. The ancient Greek writers treated P. with reference to an ideal perfect state, which each propounded according to his own speculative views, pointing out the variation of every existing government from his standard.—The P. of a country sometimes implies the course of its government.

POLIZIANO, *po-lē-tse-â'no*, ANGELO, known often under the Latin form POLITIANUS (anglicized POLITIAN): 1454, July 14—1494, Sep. 24; b. Montepulciano, in Tuscany; son of a doctor of civil law. The family name was Ambroginis, but P. took his from his native town—in Latin, *Mons Politianus*. At the age of 15 he published his famous *Stanze* (poem of 1,400 lines) in honor of Giulio de' Medici. Lorenzo de' Medici enabled the brilliant lad to continue his studies without pecuniary harassments, by appointing him tutor to his two sons, and subsequently gave him a residence in his charming villa near Fiesole. In 1484 he accompanied the Florentine ambassadors to Rome, and at the pope's request he translated (into Latin) the Greek historian Herodianus, for which he received 200 golden crowns. He made Latin versions of the *Enchiridion* of Epicetus, the *Charmides* of Plato, and other works, with such elegance, that Erasmus pronounced him a master in translation. After having filled for some years a chair of Latin literature, he began teaching Greek. Pupils came to him from all the great cities of Italy, and even from distant parts of Europe. In 1489 appeared his *Miscellanea*, a collection of critical and other observations on the ancient authors. Toward the close of his life, he entered into priest's orders, and was made canon of the Cathedral of Florence. Among the brilliant scholars of the classical Renaissance, P. occupies a foremost place in virtue of his vigor and originality. His intellect was penetrated by admiration of the chaste and noble literature of antiquity; but there was nothing servile in his imitations; he reproduced without difficulty —because he was himself a kindred genius—the strength of Tacitus, the elegance of Livy, and the conciseness of Sallust; his Latin poems, especially his elegies, display the beauty and ardor of his imagination. Among his vernacular pieces are his *Canti Carnascialeschi* (Carnival, or Merry Ballads), remarkable for felicity of style, pathos, and abundant imagery. His *Orfeo* was one of the earliest dramatic compositions produced in Italy. The editions of P.'s separate writings have been numberless. See Seraszi's *Vita di A. Politiano;* N. A. Bonafous *De A. Politiani Vita et Operibus* (Paris 1845); Tiraboschi's *Storia della Litterat. Italiana;* Greswell's *Memoirs of Politiano*, and Roscoe's *Lives of Lorenzo de' Medici and of Leo X.*

POLK, *pōk*, JAMES KNOX: eleventh president of the United States: 1795, Nov. 2—1849, June 15; b. Mecklenburg co., N. C.; descended from an Irish family named Pollock, that had immigrated into this country several generations before. His father was a farmer, and his early advantages not great. Entering the Univ. of N. C., he graduated 1818, and was admitted to practice law two years later. At the age of 28, he was elected to the state legislature; and, at 30, to congress, where he joined in the strong opposition to Pres. John Quincy Adams. He was twice elected speaker, 1835 and 37, continuing in congress until 1839, when he was elected gov. of Tenn. At the democratic convention in Baltimore 1844, he was nominated for pres., and was elected over the whig candidate, Henry Clay. The most notable members of his cabinet were James Buchanan, sec. of state; Robert J. Walker, sec. of the treasury; William L. Marcy, sec of war; and George Bancroft, sec. of the navy, succeeded by John Y. Mason. The Mexican and Oregon boundary questions and their settlement were the chief events of his administration. After the recognition of the independence of Texas by Mexico, the Mexican govt. claimed the territory between the Nueces and the Rio Grande, against the claim of Texas. In 1837 the application of Texas to be annexed was opposed by Pres. Van Buren as a breach of amity with the neighboring republic. His successor, Pres. Tyler, earnestly pursued the plan of annexation, and this policy was inherited by Pres. Polk, under whose administration congress proceeded to annex, the question of boundary being expressly stated as one yet to be adjusted. It was, however, only two days after the act of annexation, 1845, July 4, that Pres. P., by request of congress, sent Gen. Taylor to the defense of Texas; and the gen., by advice received there, occupied the disputed ground. Futile negotiations intervened, and Gen. Taylor advanced to the Rio Grande, facing the Mexican troops, which made the first attack. In judging the course of Pres. P., the logic of events must thus be considered; but he was at least responsible indirectly for the action of his subordinates in seizing the ground in dispute; he could, as *ex-officio* commander-in-chief, have prevented it by cautionary instructions; and he would have done so if he had possessed the firm and high sense of honor manifested by Pres. Van Buren in our relations with Mexico. A large part of the responsibility for the Mexican war rests upon P. He has been further criticised, and by army men, for his neglect to make due provision for the army at that time, especially for failing to fill the skeleton regiments, thus prolonging the struggle, and bringing disaster in its inception.—The economical and administrative changes during his presidency were principally the adoption of the low tariff of 1846, the collection and management of revenue without the assistance of banks, and the establishment of the dept. of the Interior. Pres. P. retired after one term of service, having pledged himself at his nomination to decline re-election. Soon after his retirement, he fell ill, and died at Nashville, Tenn. He was held in much esteem for his excellent personal traits; but, as an occupant of the highest office in the republic, he must be classed with a number of others who have been elected quite as much for negative as for positive qualities, and have been but the instruments of whatever policies led to their nomination.

POLK, Leonidas, D.D.: bishop of the Prot. Episc. Chh., and Confederate general: 1806, Apr. 10—1864, June 14; b. Raleigh, N. C. He was graduated at West Point Milit. Acad. 1827; but the same year resigned his lieutenancy in the artillery, and applied himself to preparation for ministry in the Prot. Episc. Church, taking orders 1830. In 1838 he was appointed missionary bp. of Arkansas, with oversight provisionally of missions from Ala. to Tex.; and three years later he became bp. of La. At the opening of the war of secession, he offered his services to the Confederacy, was appointed maj.gen., and placed in command of the Mississippi from the Arkansas to the Ohio river. He constructed fortifications, such as Forts Donelson and Henry. Joining Gen. A. S. Johnston, he participated in the battle of Shiloh; and later, under Gen. Bragg, in the battles of Perryville, Murfreesboro, and Chickamauga. In 1864 he commanded the dept. of the Mississippi, having been promoted lieut gen.; was at the head of an army-corps in subsequent operations, and took part in the Atlanta movements. He was killed by a cannon-shot while making a reconnaissance on Pine Mountain, near Marietta, Ga. Retaining his ecclesiastical office to the end, he revived the mediæval traditions of warrior bishops.

POLK, Thomas: patriot: about 1732–93; great-grandson of Robert P. or Pollock, who emigrated from Ireland and settled in Md. In 1753 Thomas left Penn., whither his father had removed, and settled in Mecklenburg co., N. C. In 1769 and 71 he was a member of the provincial assembly. In 1775 he issued the summons for election of the delegates who framed the Mecklenburg Declaration of Independence (q.v.), took an active part in the revolution, commanding a battalion of minute men, and later the 4th regt. in the army of Washington. P. was offered by Gen. Greene a commission as brig.gen., but as he had incurred the displeasure of Gen. Gates, the commission was never confirmed. At his death in Charlotte, N. C., he owned large and valuable estates acquired by purchase from the soldiers of the land warrants issued to them for their services.

POLK, William: 1758, July 9—1834, Jan. 4; b. in Mecklenburg co., N. C.: patriot; son of Thomas P. While in college at Charlotte he received a commisson as 2d lieut. in the 3d S. C. regt. of the revolutionary army. In 1776 he was elected major of the 9th N. C. regt. in the army of Washington. He was in the battles of Brandywine, Germantown, Eutaw Springs, and Camden, and was twice badly wounded. He was in active service until the close of the war, after which he was a member of the N. C. legislative assembly. In 1812 he was appointed by President Madison brig.gen. in the U. S. army, but declined the commission for political reasons. On Lafayette's visit to this country 1824, P. was one of the commissioners to receive him. He outlived all the other revolutionary field officers of his state, and died in Raleigh.

POLKA, n. *pŏl′kă* [Bohem. *pulka*, half]: dance of Polish or Hungarian origin, performed by two persons in $\frac{2}{4}$ time, and so called from the half-step characteristic of it; the air played to the dance. This dance has the rhythmical peculiarity of being accented on the third quarter of the measure. It became fashionable in w. Europe and in the United States about 1841. **Polk**, v. *pōlk*, to dance the polka. **Polk′ing**, imp. **Polked**, pp. *pōlkt*. **Polka-jacket**, a kind of knitted jacket worn by women.

POLL, n. *pōl* [Low. Ger. *polle*, head: Dut. *polle*, head, top: Icel. *kollr*, top, stump, head: Sp. *cholla*, skull: Icel. *bolr*, the trunk—from *bola*, to cut off]: the head; the back part of the head; a register of heads or persons; the entry of the names of persons qualified to vote for civil officers and members of parliament; an election of civil officers, or the place where the votes are taken: V. to lop or cut off the head, as of a tree; to clip or cut off hair or wool; to shear; to enter a person's name in a list or register of voters; to receive or give votes. **Poll′ing**, imp.: Adj. receiving or riving votes, as a *polling*-clerk; designating the place where votes are given, as a *polling*-place. **Polled**, pp. *pōld*, cropped; brought to the poll, as votes: Adj. lopped, as trees; shorn. **Poll-book**, a register of persons who can exercise the franchise, or who have exercised it. **Poll-clerk**, a clerk who enters the names of voters at an election as they appear to give their vote. **Poll evil**, a swelling on the head or nape of the neck in horses. **Poll-tax**, a sum of money exacted from each person or head as a tax (see Capitation). **A polled cow**, a hornless cow. **Polled cattle**, hornless cattle, a mixed breed of Scotch cattle.

POLL, n. *pŏl* [Gr. *hoi polloi*, the many]: a term applied at Cambridge to those men who do not take honors, but who only pass the examination required for a degree.

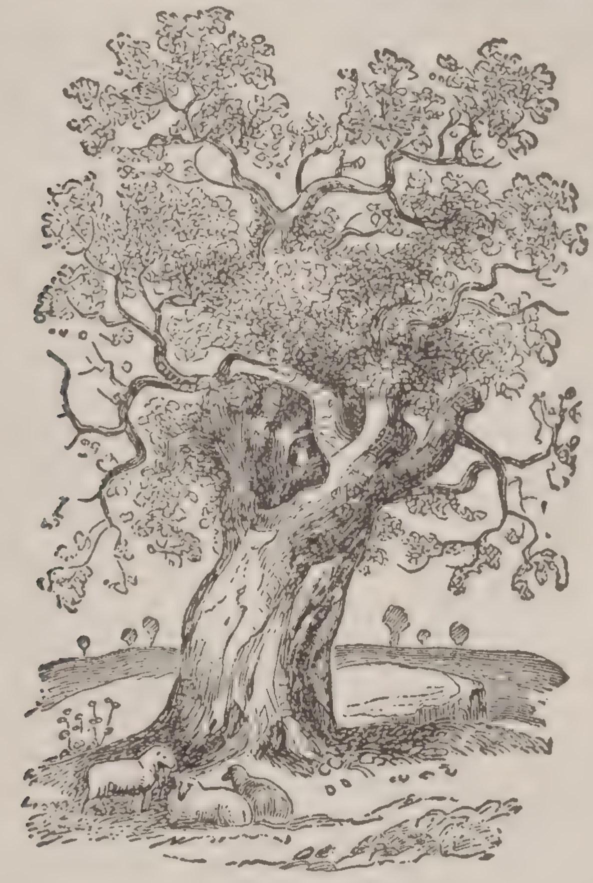
POLLACK, n. *pŏl′lăk*, or **Pollock**, *-lŏk* [Gael. *pollag*, the whiting; Ir. *pullog*, pollack], (*Merlangus pollachius*): fish of family *Gadidæ*, of same genus with the whiting and coal-fish: common on British coasts. It is very playful, often gamboling on the surface of the water. It attains about the same size as the coal-fish. It has three dorsal fins; the body is of longish shape; lower jaw much longer than the upper; tail slightly forked. The flesh is reckoned superior to that of the coal-fish. Young pollacks are sold sometimes as whitings, to which, however, they are not nearly equal. No fish more readily rises to the artificial fly. The fly is merely a bit of white feather tied to a common bait-hook. Worsted is sometimes used instead of the feather; and flies of different colors are sometimes used together, with great success. No reel is employed, and any stick is good enough for a rod; a few yards of string make a sufficient line.—The COMMON P. (*M. purpureus*) of the N. England coast is brownish-green above and white below, 1–3 ft. in length; much esteemed for food.—The BLACK P. or COAL-FISH (*M. carbonarius*), named from its black back, is of like size, and ranges from N. Y. northward.

POLL-ACT, *pōl'ăkt:* sanguinary act, passed at Trim in Ireland, by the Junto of the Pale 1465, under the Earl of Desmond, deputy. It ordained 'that it shall be lawful to all manner of men that find any theeves robbing by day or night, or going or coming to rob or steal, or any persons going or coming, having no faithful man of good name and fame in their company in English apparell, that it shall be lawfull to take and kill those, and to cut off their heads, without any impeachment of our sovereign lord the king. And of any head so cut off in the county of Meath, that the cutter and his ayders there to him cause the saed head so cut off to be brought to the portreffe to put it upon a stake or spear, upon the Castle of Trim, and that the saed portreffe shall testify the bringing of the same to him. And that it shall be lawful for the saed bringer of the saed head to distrain and levy by his hand (as his reward) of every man having one ploughland in the barony, two pence; and of every man having half a ploughland, one penny; and of every man having an house and goods, value forty shillings, one penny; and of every cottier having one house and smoak, one half-penny.' Much slaughter is said to have been committed under this remarkable act.

POLLAN, n. *pŏl'lăn* [Ir.], (*Coregonus Pollan;* see COREGONUS): fresh-water fish of family *Salmonidæ*, native of lakes in Ireland, abundant particularly in Lough Neagh, where it is often seen in large shoals, which issue from the deep waters, and haunt the shore from spring to autumn, when great numbers are taken by nets. The P. is 10 to 12 inches in length; it resembles the Gwyniad, but has not the snout produced like that fish; and there are differences in size and position of the fins. It is very like *Coregonus sikus*, a species found in the most n. parts of Norway. The spawn of the P. is deposited in Nov. and Dec. on the rocky or stony parts of the bottom of the lake which it inhabits. It is a well-flavored fish. The cry of 'Fresh Pollan' is even more common in Belfast during summer than that of 'Fresh Herring.'

POLLARD, n. *pŏl'lėrd* [from POLL 1]: a tree whose head has been lopped; a stag without horns—also applied to cattle; a clipped coin; a mixture of bran and meal: V. to poll, as trees. POL'LARDING, imp. (see below). POL'LARDED, pp. POLLARD-TREES, or POLLARDS, trees cut down so as to leave only the lower part of the trunk, which gives off numerous buds and branches. POLLARD, see WHEAT.

POL'LARDING: cutting off the whole crown of a tree, leaving it to send out new branches from the top of the stem. The new branches are never equal in magnitude to the original branches of the tree, though often more numerous, and when P. is often repeated, the scars and stumps form a thick ring at the top of the stem, from which small branches spring. Pollards are not beautiful; but P. is practiced with advantage in districts where fuel is scarce, the branches being cut off for fuel every third or fourth year. Willows, Poplars, Alders, Elms, Oaks, and Limes are the trees most frequently pollarded, and in parts of Europe the White Mulberry. Trees of most rapid growth are preferred where fuel is the object; and willows, poplars, and alders are planted along water-courses, and in rows in moist meadows and bogs. Oaks are sometimes pollarded chiefly for the bark of their branches, and the whole treatment resembles that of copse-wood. In parts of Germany, landscapes may be seen of open country with many scattered oak and elm pollards, presenting a very peculiar appearance.



Pollard Oak.

POLLEN, n. *pŏl′lĕn* [L. *pollen*, fine flour: Gr. *palē*, the finest meal—from *pallō*, I sift by shaking: F. *pollen*, pollen]: fecundating powder or dust contained in the anthers of flowers, and afterward dispersed on the stigma (see Stamen: Fecundation): the bloom of leaves. Pol′lena′rious, a. *-ā′rĭ-ŭs*, consisting of pollen or meal. Pollenin, or Pollenine, n. *pŏl lĕn-ĭn*, peculiar substance obtained from the pollen of certain plants. Pol′linar, a. *-lĭn-âr*, or Pol′linose, a. *-ōs*, covered with a very fine dust resembling pollen. Pollinic, a. *pŏl-lĭn′ĭk*, pertaining to pollen. Polliniferous, a. *pŏl′lĭn-ĭf′ėr-ŭs* [L. *fero*, I bear]: bearing or containing pollen. Pollen-mass, or Pollinia, n. *pŏl-lĭn′ĭ-ă*, an agglutinated mass of pollen, occurring in some orders of plants. Pollination, n. *pŏl′-lĭ-nā′shŭn*, the conveyance of the pollen from the anthers to the stigma in Angiosperms, or to the nucleus in Gymnosperms. Pollinodium, n. *pŏl′lĭ-nō′dĭ-ŭm* [Gr. *eidos*, resemblance]: another name for the *antheridium*, which see. Pollen-tube, the tube emitted by the pollen-grain after it is applied to the stigma.

POLLENZA, *pŏl-lĕn′zâ*, Sp. *pōl-yĕn′thâ:* well-built town in the n. part of the island of Majorca, about 2 m. w. of the Bay of Pollenza, 28 m. n.w. of Palma. It has a Jesuits' college and some manufactures of black woolen cloth. Pop. about 7,500.

POLL EVIL, *pōl ē′vl:* disease affecting the horse. It appears as an inflamed swelling at the top of the head or nape of the neck, and is liable to develop into an almost incurable abscess. It may be caused by the pressure of a halter or bridle, a tight check-rein, or by any injury to the top of the head. As soon as the swelling appears, an effort should be made to reduce inflammation by the use of cold water, or a mixture of water, vineger, and arnica; if a tumor forms it should be poulticed, or an ointment of lard and iodine applied; when matter forms, the tumor should be opened at its lowest point and lengthwise of the neck, the matter pressed out, and the cavity cleansed by frequent injection of tincture of iodine or a weak solution of chloride of zinc. The general health of the animal also must receive attention. When possible, a competent veterinarian should be consulted as soon as the disease appears.

POLLEX, n. *pŏl′lĕks* [L. *pollex*, the thumb]: the thumb in man; the innermost of the five normal digits of the anterior limb of the higher vertebrates.

POLLINCTOR, n. *pŏl-lĭngk′tŏr* [L.—from *pollin′gĕrĕ*, to lay out a corpse]: one who prepares materials for embalming the dead.

POLLIO, *pŏl′lĭ-ō*, Caius Asinius: politician, soldier, and author of some merit, and more reputation: b.c. 76—a.d 4; b. Rome; of Marrucinian descent. His first ambition was to be an orator, and in his youth he seized every opportunity of hearing such men as Hortensius and Cicero. When civil war broke out between Cæsar and Pompey, P. sided with Cæsar, was present at the crossing of the Rubicon, and accompanied the great general in his rapid triumphal march through Italy. He joined Cæsar in his expedition to Greece against Pompey, and took part in the decisive battle of Pharsalia, B.C. 48. At the time of Cæsar's assassination (B.C. 44, Mar. 15), P. was gov. of Hispania Ulterior (Further Spain), and carrying on the war against Sextus Pompey. In the subsequent struggles, he sided with the triumvirate (Antony, Lepidus, and Octavian) against the oligarchic senate; and on the triumph of the former, was appointed administrator of Transpadane Gaul, in which capacity he saved the property of the poet Virgil at Mantua from confiscation. After Antony and Octavian had quarrelled, it was P. who effected their temporary reconciliation at Brundusium, B.C. 40; next year he conducted a successful campaign against the Parthini, a people of Illyria, and was granted a triumph therefor, after which he withdrew from political life. P. died at his Tusculan villa. Besides having reputation for oratory, P. was notable as historian, poet, and critic; and the loss of his writings is to be regretted. His literary and political criticism of his contemporaries, in particular, appears to have been valuable. He was a distinguished patron of men of letters, such as Catullus, Horace, Virgil; and was founder of the first public library at Rome.

POLLNITZ, *pol′nits*, KARL LUDWIG, Freiherr VON: writer of memoirs: 1692, Feb. 25—1775, June 23; b. near Cologne. He was equally remarkable for talents and lack of principle; and while his father's position as minister of state to the Elector of Brandenburg gave him access to court-circles, his extravagance and eccentricity, coupled with his vagabond habits, often reduced him to the greatest poverty. But after wandering all over Europe, taking service in the church in Austria, and in the army in Spain, he finally attracted the favorable notice of Frederick the Great, who appointed him his reader, and made him director of the theatre at Berlin. After having twice changed from Rom. Catholicism to Calvinism, he proclaimed himself a member of the Church of Rome shortly before his death. Among the numerous memoirs, either written by or ascribed to him, the following were the most popular in their day: *Lettres et Mém., et la Relation de ses premiers Voyages* (Amst. 1735); *État abrêgé de Saxe sous Auguste III.* (Frankf. 1734); *Hist. secrète de la Duchesse d'Hanovre, épouse de George I.* (Lond. 1732). After his death, Brunn brought out P's. *Mémoires pour servir à l'Histoire des quatre derniers Souverains de la Maison de Brandenbourg* (2 tomes, Berl. 1792).

POLLOCK: see POLLACK.

POLLOCKSHAWS, *pŏl-lŏk-shawss′*: municipal borough in the county of Renfrew, Scotland; on the banks of the White Cart, about 2½ m. s.w. of Glasgow, of which it is a suburb. P. is a manufacturing town; cotton-spinning, calico-printing, silk-weaving, bleaching, iron-founding, and fancy dyeing are extensively carried on. Pop. (1881) 9,333; (1891) 10,228.

POLLOK, *pŏl'ok*, Robert: Scottish poet: 1798–1827, Sep. 17; b. Muirhouse, parish of Eaglesham, county of Renfrew. After taking his degree at Glasgow Univ., he entered the Divinity Hall of the United Secession Church, where he studied five years; and in 1827 was licensed to preach, having already written the *Course of Time;* and its composition, together with his ardor in study, brought on consumption. The poem was published by Blackwood 1827, Mar., and was highly praised, but the voice of praise fell on a dying ear. P. set out for Italy, but died at Shirley Common, near Southampton.

The Course of Time was immediately successful, and has run through more than 20 editions, and is extremely popular in Scotland. Its subject is the spiritual life of man, and his hereafter. It is a work of genius, but unequal in merit. Its ten 'books' contain eloquent and spirited passages, written with elevated feeling and diction, and with abundant enthusiasm and imagery; but considerable portions of it read like a dull sermon turned into blank verse. The writer drew his inspiration from nature, from Milton, and the Shorter Catechism—from the last, perhaps, most of all. His Memoir, by his brother, was published 1843. P. wrote also *Tales of the Covenanters,* pub. anonymously.

POLLUTE, v. *pŏl-lôt* [L. *pollūtus*, soiled or defiled—from *pollŭo*, I defile]: to make foul or unclean; to defile; to taint with guilt; to corrupt; to vitiate; to violate. Pollu'ting, imp.: Adj. adapted or tending to defile or taint. Pollu'ted, pp.: Adj. rendered unclean; defiled; tainted with guilt. Pollu'tedly, ad. *-lĭ*, in a polluted manner. Pollu'tedness, n, *-nĕs*, the state of being polluted; defilement. Pollu'tingly, ad. *-lĭ*, corruptingly. Pollu'ter, n. *-tėr*, one who pollutes. Pollution, n. *pŏ-lô'shŭn*, act of polluting; defilement; uncleanness; impurity; in *Scrip.*, guilt or idolatry.—Syn. of 'pollute': to contaminate; defile; taint; corrupt; soil; debauch; vitiate; abuse; ravish; violate; pervert.

POLLUX, n. *pŏl'lŭks* [in L. and Gr. myth., a famous pugilist, twin brother of Castor]: bright star of the second magnitude in the constellation Gemini or the Twins. Castor and Pollux, in *geol.*, two closely allied minerals of the felspar family, resembling quartz in their hardness and transparency; in *astron.*, a constellation.—See Castor and Pollux.

POLLUX, *pŏl'lŭks*, Julius (real name Polydeuces): Greek grammarian and philosopher: about 130—about 188; b. at Naucratis, Egypt. He studied at Athens, and there he afterward taught grammar and rhetoric. His only work extant is the *Onomasticon*, a dictionary of Greek words which, instead of being in alphabetical order, are arranged by groups according to their subjects, and defined and illustrated by quotations from various writers. This work, which is of great value to Greek students, has been edited by a number of authors: the first edition appeared at Venice 1502, one by Hemsterhuys at Amsterdam 1706, another by Dindorf at Leipzig 1824, a fourth by Bekker at Berlin 1846. An elaborate treatise on P. and his work by Kirschoff was brought out at Berlin 1874. He was held in high esteem by the two emperors Marcus Aurelius and Commodus, during whose reign he taught at Athens.

POLO, *pō'lō* [prob. altered form of Thibetan *pulu*, ball]: game in which the players, mounted on horseback, endeavor with stout sticks curved at the ends, to strike a ball through a goal. Its original home seems to have been Thibet; but it is known and popular in most of the Himalayan countries. The game reached India through Afghanistan, and was speedily and eagerly taken up by members of the English cavalry regiments. It was introduced into England about 1871, and subsequently found its way to the United States. Although the rules vary in minor particulars, they are everywhere substantially identical.

The game may be briefly described as follows, as played at Hurlingham, England, and Newport, R. I. The grounds form a parallelogram not less than 250 yards long, and nearly as wide; the goal at each end being 8 yards wide and marked by two posts. The ball used is 3 inches in diameter, and the sticks are each four ft. long with a cross-piece on the head. The stick is not long enough to touch a ball on the ground without the rider's stooping somewhat; and he must be prepared to stoop to right or left with equal readiness, and to drive the ball backward, forward, or sideways.

The players are mounted on specially trained ponies, which must be free from vice, and must not exceed 14 hands in height. From three to six persons can play on each side; in match games the number must be four. Two umpires are chosen, one for each side, and the ball is tossed into the middle of the field. The players take up their positions behind their respective goal-posts, and at the dropping of the flag they charge toward the ball, each side striving to reach and strike it first. If the ball is struck out of bounds, the nearest umpire returns it. Match games last an hour and 10 minutes, with 5 minutes' rest after each 20 minutes' play. A player breaking his stick must himself fetch a new one; if he drops his stick, he must dismount and recover it, and while on the ground is forbidden to strike at the ball. A ball hit past but not through the goal, entitles the defending side to a 'hit off' from the goal-line. One player on each side acts as goal-keeper, and remains at his goal. A player may impede his adversary with his stick; but must not reach under or over his opponent's pony. A player may interpose himself between his adversary and the ball: but not when he is in possession of the ball. The game involves considerable expense.

POLO, *pō'lō*, MARCO: famous traveller: about 1254–1324; b. Venice; of a noble family of Dalmatian origin. His father, Nicolo P., and his uncle, Matteo P., both eminent merchants, had, previous to his birth, set out on a mercantile expedition, visiting Constantinople, Soldaya or Sondach (on the Euxine), and Bulgar (on the Volga), the capital of Barkäi, Khan of Keptchak. Thence they travelled round the n. side of the Caspian Sea to Bokhara, where they remained three years, studying the Mongol language and trading; but 1261, some ambassadors from the Perso Mogul khan to Kûblai (q.v.), Grand Khan of the Mongols, happening to pass through Bokhara, the brothers P. resolved to accompany them to Kemenfu, the summer residence of the Khagan. They were well received by Kûblai, who had never before met European gentlemen. He was very inquisitive concerning the peoples and mode of government in Europe, and commissioned them to act as his envoys to the pope, bearing a written request for 100 Europeans, well learned in the sciences and arts, to act as instructors to the Mongols. They reached Venice 1269; but finding it impossible to discharge the mission with which they had been intrusted, they set out on their return 1271, taking with them young Marco, and arrived again at the court of Kûblai Khan, 1275. Their second reception was still more honorable than the first, and the Khagan took special notice of Marco, from the rapidity with which he learned the customs and language of the Mongols. His wisdom and the nobility of his demeanor also recommended him as a fit envoy to the various neighboring rulers; and during his residence at their several courts P. was in the habit of closely observing the manners and customs of the country, and delivering on his return a detailed report to the Khagan. These reports were the groundwork of the book which informs us regarding the state of central and eastern Asia in the end of the 13th c. P.'s first mission was to the court of Annam or Tonquin (1277), and during his residence there he acquired much information, both from his own observation and from report, concerning Tibet, Yunnan, Bengal, Mien (or Pegu), and s. China; he was employed next to aid in making an inventory of the archives belonging to the court of the Song dynasty; and soon afterward was appointed gov. of the town of Yang-tchow, in the province of Kiang-si, in e. China, which post he held three years. He also accompanied a Mongol army to the attack of the kingdom of Pegu; and closed the list of services rendered to Kûblai by accepting the embassy to Tsiampa, the s. part of Cochin-China. Having thus passed 17 years in the service of the Mongol khan, and visited the chief countries and cities of e. Asia, travelling through kingdoms (e.g., China) which no European had ever seen before, and acquiring much knowledge of other kingdoms (e.g., Japan, called by P. *Zipangu*), the existence of which had not been even suspected, he succeeded in obtaining permission to join the escort of a Mongol princess who was travelling to the court of Persia. The three Polos accordingly set out 1291, travelling through China, and thence, by sailing through the Chinese Sea and Indian Ocean, finally arrived at Teheran, where they stayed some time; but learning that Kûblai Khan was now dead, they continued their journey, and arrived at Venice 1295, bringing with them much wealth and many precious objects, the fruits of their trading. Marco, in the following year, commanded his own galley in the great battle off Curzola, in which the

Venetians, under Dandolo, were defeated by the Genoese under Doria; and was taken prisoner and immured in a dungeon at Genoa. Here he dictated, with the aid of memoranda that he had made during his travels, an account of his journey through the East, which was subsequently revised with care. After his liberation he returned to Venice, where he was appointed member of the grand council; and in that city he died. P.'s narrative created an immense sensation among the learned public, and many did not hesitate to affirm that it was pure fiction; but the Rom. Cath. missionaries and subsequent Venetian travellers into those remote regions verified many of P.'s statements, and then came a reaction of public opinion; P.'s wonderful minuteness, extensive research, and accuracy being the theme of universal admiration. His work was of inestimable value as a stimulant and guide in geographical research; it encouraged the Portuguese to find the way to Hindustan round the Cape of Good Hope; and it roused the passion for discovery in the breast of Columbus, thus leading to the two greatest of modern geographical discoveries. The first Italian edition appeared Venice 1496, and has been often reprinted. A critical edition was edited 1827 by Baldelli; a new one by Bartoli (1864). There are about 60 translations in various languages, including several English ones. But one of the best in any language is the standard English one by Col. Yule, *The Book of Marco Polo* (2 vols. 1871; new ed. 1875), with maps, plates, and learned annotations and illustrations, largely from oriental sources.

POLONAISE, n. *pō'lŏ-nāz'* [F. *polonais*, Polish]: a robe or dress adopted from the fashion of the Poles; in *music*, a movement of three crotchets in a bar; a dance adapted to such music; also Po'LONESE', n. *-nēz'*, and Po'LONISE', n. *-nīz'*. Po'LONESE', n. the Polish language.

POLONY, n. *pō-lō'nĭ* [a corruption of *Bologna* sausage]: a kind of sausage.

POLOTSK, *pō-lŏtsk':* town of w. Russia, govt. of Vitebsk, on the banks of the Düna, where that river is joined by the Polota. It was founded in the 9th c., is the seat of a bp. of the Greek United Church; and has several churches, a convent, and a school for the nobility. Here, 1812, the Russian general, Wittgenstein, defeated the French under Oudinot and Sire. Pop (1880) 12,200; (1885) 19,134.

POLTAVA, *pŏl-tâ'va:* government in Little Russia, between Kiev on the w. and Kharkov on the e.; 19,265 sq. m. The surface is flat, with gradual slope s.w. to the banks of the Dnieper, which forms the s. boundary, and into which the chief rivers—the Sula, Psiol, and Worskla—flow. The govt. does not abound in wood, but possesses rich and extensive pastures. The soil is mostly clay and fertile vegetable mold, and the climate is healthful. Agriculture and cattle-breeding are staple occupations. The manufactures are not numerous nor important. Commerce is chiefly in the hands of Jews, and is transacted mostly at the fairs, the most important of which are those of Poltava and Romny. Pop. (1880) 2,400,000; (1890) 2,794,739.

POLTA'VA: chief town of the govt. of P.; on the right bank of the Worskla, a tributary of the Dnieper, about 934 m. s.s.e. of St. Petersburg. P. has few manufactures, and its trade is active only during the four annual fairs. The most important fair, the Illinsky, lasts about a month. At these fairs, merchandise is exposed for sale worth $20,000,000. The principal articles of traffic are cloths, woolen tissues, colonial productions, fur, wool, horses, and agricultural produce and implements. P. is famous as the scene of Charles XII.'s defeat by Peter the Great 1709, and a monument commemorating the victory of the czar stands in the principal square; while three m. from the town a mound surmounted by a cross, still known as the 'Swedish Tomb,' marks the battle-field. P. has a cathedral, numerous churches, and a school for cadets. Pop. (1880) 34,000; (1890) 42,210; (1897) 53,060.

POLTROON, n. *pŏl-trôn'* [F. and Sp. *poltron*, a scoundrel, a coward—from It. *poltrone*, an idle fellow—from *poltra*, a bed to lie on during day; *poltrire*, to play the coward: Ger. *polster*, a mattress; *polterer*, a braggart]: a coward; one without courage. POLTROON'ERY, n. *-ėr-ĭ*, baseness of mind; want of spirit; cowardice.—SYN. of 'poltroon': dastard; craven; coward; scoundrel.

POLVERINE, n. *pŏl'vėr-ĭn* [It. *polverino*, ashes used in the making of glass—from *polvere*, dust—from L. *pulvis*, dust]: a kind of potash from the Levant, preferred in the manufacture of glass.

POLY-, *pŏl'ĭ-* [Gr. *polus*, many]: a common prefix, signifying 'many of; having many.'

POLYACOUSTIC, a. *pŏl'ĭ-ă-kows'tĭk* [Gr. *polus*, many; *akoustĭkos*, belonging to the sense of hearing—from *akouō*, I hear]: that multiplies or magnifies sounds.

POLYAD, n. *pŏl'ĭ-ăd* [Gr. *polus*, many]: in *chem.*, applied to an element consisting of more than one atom.

POLYADELPHIAN, a. *pŏl'ĭ-ă-dĕl'fĭ-ăn*, or POL'YADEL'PHOUS, a. *-fŭs* [Gr. *polus*, many; *adel'phos*, a brother]: in *bot.*, having the stamens united in three or more bundles or parcels, as in the class of plants POL'YADEL'PHIA, *-fĭ-ă*.

POLYADELPHOUS: see POLYADELPHIAN.

POLYANDRIAN, a. *pŏl'ĭ-ăn'drĭ-ăn*, or POL'YAN'DROUS, a. *-drŭs* [Gr. *polus*, many; *anēr*, or *andra*, a man]: in *bot.*, having many stamens, or any number above twenty; belonging to the class POL'YAN'DRIA, *-drĭ-ă*.

POLYANDRY, n. *pŏl'ĭ-ăn'drĭ* [see POLYANDRIAN]: practice of women having more than one husband at the same time; the opposite of *polygamy* (see MARRIAGE). POL'YAN'DRIC, a. *-drĭk*, relating to polyandry; mating with several males.—*Polyandry* has its chief seat in Tibet. There a wife commonly is the wife of a whole family of brothers—the elder brother being chief husband. In the Himalayan and sub-Himalayan regions adjoining and under the influence of Tibet it is of frequent occurrence in the same form, as in the valley of Kashmir, in Ladak, among the Keoch, among the Telingese. Further s. in India, P. is found among the Tudas of the Neilgherry Hills, the Coorgs of Mysore, and the Nayars of Malabar. It is found again off the Indian coast in Ceylon; and eastward it is an ancient though now almost superseded custom in New Zealand, and in one or two of the Pacific islands. Northward it is found in the Aleutian Islands; and on the Amer. continent w. and n. of the Aleutians, among the Koryaks, n. of the Okhotsk Sea. In the Russian empire on the w. side, it is found among the Saporogian Cossacks: thus it can be traced at points half round the globe. But further, it exists in several parts of Africa; and it occurs again in many parts of America among the red men. We have the authority of Humboldt for its prevalence among the tribes on the Orinoco, and in the same form as in Tibet. 'Among the Avaroes and the Maypures,' he says, 'brothers have often but one wife.' Humboldt also vouches for its former prevalence in Lancerota, one of the Canary Islands. Thus, P. is a phenomenon of human life independent of race and country.—See Latham's *Descriptive Ethnology* (1859), I. 24, 28; II. 398, 406, and 462; Humboldt's *Personal Narrative*, Williams's translation, 1819, V. part 2, p. 549; and chap. i. vol. I. p. 84; Hamilton's *New Account of the East Indies* (Edin. 1727), I. 274 and 308; Reade's *Savage Africa*, p. 43; Erman's *Travels in Siberia*, II. 531; *Marriage Ceremonies*, by Seignior Gaya (translation), 2d ed. (Lond. 1698), 70, 96; Emerson Tennent's *Ceylon*, 3d ed. (1859), II. 429; Grey's *Polynesian Mythology*, 1855, p. 81; *A Summer Ramble in the Himalayas* (1860); Vigne's *Kashmir; Journal Asi. Soc. Bengal*, IX.; *Asiat. Resch.*, V.; also M'Lennan's *Primitive Marriage* (1865); Herbert Spencer's *Principles of Sociology* (1876).

From ancient history we learn that the area over which P. at one time existed was even more extended; while in certain cantons of Media, according to Strabo (II. 798, and see Goguet, III. book vi. c. i.) polygynia was authorized by express law, which ordained every inhabitant to maintain at least seven wives; in other cantons, precisely the opposite rule prevailed: a woman was allowed to have many husbands, and they looked with contempt on those who had less than five. Cæsar informs us that in his time P. of the Tibetan type prevailed among the Britons (*De Bello Gallico*, lib. v. c. xiv.). There is direct evidence of its existence among the Picts in the Irish Nennius App. li., besides the traces of it remaining in the Pictish laws of succession. Indeed, to pass over communities in which something like promiscuity of intercourse between the sexes is said to have prevailed—such as the Massagetæ, Agathyrsi, and the ancient Spartans—we find several among which P., or a modified promiscuity, must have been the rule. Some, assuming (though this assumption seems scarcely warranted) that the legal obligation laid on younger brothers in their turn to marry the wives of their deceased elder brother, is a relic of P. of the Tibetan type, hold that P. prevailed at one time throughout India (*Institutes of Menu*, iii. s. 173, and ix. ss. 57, 58), among the ancient Hebrews (Deut. xxv. 5–11); in Siam, Burmah, in Syria among the Ostiaks, the But (Bodo), the Kasia, and the Puharies of Gurhwal. Traces of it indeed remained in the time of Tacitus among the Germans (Tac., *Germ.*, xx., Latham's ed. 67 and *seq.*). In short, P. is by many writers considered as one of the transitional forms in the advance from a primitive state of promiscuity; but the assumption that pure promiscuity ever had a widely established and enduring existence is undeniably dubious. The origin of this peculiar institution seems connected with the want of balance between the numbers of the sexes, due to the practice of female infanticide, which is its almost invariable accompaniment. Tribes of warriors, wholly devoted to military life, find women an incumbrance rather than a solace; and from this cause, and probably from the difficulties of subsistence, formed the practice of killing their female children, sparing them only when they were the first-born. The disparity of the sexes would lead to P., and once instituted, the custom would in many cases continue to exist after the habits and necessities which produced it disappeared. In several places, as in Ladak, where P. prevails, the sexes are now either equally balanced, or the female sex predominates. In these cases, polygynia and polyandry are commonly found existing side by side. The subject is one which demands and as yet has not received full investigation.

POLYANTHES, n. *pŏl'ĭ-ăn'thēz* [Gr. *polus*, many; *anthos*, a flower]: a genus of showy garden flowers, ord. *Liliāceæ*. POLYANTHES TUBEROSA, *tūb'ėr-ōz'ă* [L. *tūbĕrōsus*, having fleshy knots—from *tūber*, a protuberance]: the Tuberose (q.v.), prized for its fragrance and beauty.

Polyanthus.

POLYANTHUS, n. *pŏl'ĭ-ăn'thŭs* [Gr. *polus*, many; *anthos*, a flower]: kind of Primrose (q.v.), much prized and cultivated by florists. It is generally believed to be a variety of the Common Primrose (*Primula vulgaris*), produced by cultivation, in which an umbel of numerous flowers is supported on a common *scape* (leafless flower-stem), instead of each flower rising on its own stalk from the crown of the root; a modification to which a tendency appears often in the wild plant itself. Thus, in its habit it somewhat resembles the cowslip and oxslip, while in the size of its flowers it is more like the common primrose; but instead of the pale uniformity of the wild plant, it exhibits great variety of delicate and beautiful colors. The sub-varieties are innumerable, new ones being continually produced from seed, and of short duration. The seed is sown about midsummer, and flowers may be expected in abundance next year, if the young plants are properly planted out. A rich free soil is most suitable. The P., more than its congener, the auricula, loves shade and moisture. It is very hardy, and seldom suffers from the most severe winters. Fine kinds are preserved for a time by dividing the root. The cultivation of the P. is assiduous and successful in England.

POLYAN'THUS NARCIS'SUS: see NARCISSUS.

POLYARCHY, n. *pŏl'ĭ-âr'kĭ* [Gr. *polus*, many, and *archē*, government]: the government by many—opposed to *monarchy;* also POLYGARCHY. POLYATOM'IC, a. *-a-tŏm'ĭk*, in *chem.*, term applied to elements which contain more than one atom in their molecules.

POLYATOM'IC AL'COHOLS: see POLYHYDRIC ALCOHOLS.

POLYBA'SIC ACIDS: acids which require two or more equivalents of a base for neutralization. Most of the inorganic acids combine with bases in such a manner that one atom of the acid is united with one atom of a metallic oxide to form a neutral salt. Nitric acid may be taken as an illustration of the acids possessing this property, and which may therefore be called *monobasic.* In other cases, e.g., sulphuric acid, one atom of acid possesses the property of combining with two atoms of base; such acids are termed *bibasic* or *dibasic.* Common phosphoric and arsenic acids are examples of a third class of acids in which one atom combines with three atoms of base, and which are therefore termed *tribasic.* No polybasic acid is known beyond tribasic.

Among the organic acids, a similar relation takes place, acetic, succinic, and citric acids affording examples of the monobasic, dibasic, and tribasic class.

The following are the most important general differences shown by acids of different degrees of basicity:

1. Each *monobasic* acid can form but *one* ether, which is neutral. 2. A *Monobasic* acid cannot form a stable, well-defined acid salt, or a salt with two or more metallic bases.

1. Each *dibasic* acid can form *two* ethers, one neutral, and the other acid. 2. *Dibasic* acids can form with each metallic base a neutral salt and an acid salt. They can form also double salts containing two metallic bases.

1. Each *tribasic* acid can form *three* ethers, one neutral, and two acid. 2. *Tribasic* acids can form *three* salts with the same metallic base, two of them acid, and one neutral.

Many attempts have been made to account for the polybasic or monobasic character of an acid, from its composition. According to Kekulé (*Lehrbuch der organisch. Chemie,* I. 210–219), the basicity depends not, as was formerly supposed, on the molecular constitution of the acid, but on the amount of oxygen contained in its radical. Further, see the article ACIDS in Watt's *Dictionary of Chemistry,* and the chemical handbooks.

POLYBASITE, n. *pŏl'ĭ-bā'sīt* [Gr. *polus,* many; *basis,* a base]: a rich ore of silver of an iron-black color.

POLYBIUS, *pō-lĭb'ĭ-ŭs:* Greek historian: about B.C. 210–128; b. Megalopolis, a town of Arcadia. From Lycortas, his father, who was among the leading men of the Achæan League, he received valuable instruction in the science of politics and the art of war. In 181 he would have visited Egypt in the capacity of ambassador, but the project of sending an embassy to that country was given up. His engaging in public affairs dates probably from this period; and he rapidly gained the confidence of his countrymen. He was one of the 1,000 noble and influential Achæans, who, after the conquest of Macedonia 168, were sent to Rome on the summons of the commissioners from that city to answer the charge of having failed to assist the Romans against King Perseus. On their arrival in Italy 167, they were not put upon their trial, but were distributed among the towns of Etruria. Owing, perhaps, to his having formed the friendship of Æmilius Paulus or of his sons Fabius and Scipio, he was more fortunately allocated than others of his countrymen. His residence was fixed at Rome and in the house of Paulus. Scipio, then about 18 years of age, became strongly attached to P., made him his companion in all his military expeditions, and profited greatly by his knowledge and experience. P. in his turn derived much advantage from the protection and friendship of Scipio, who gave him access to public documents, and aided him in the collection of materials for his great historical work. In 151 the surviving Achæan exiles were permited by the Roman senate to return to Greece, and among them was P., who arrived in Peloponnesus after a residence of 17 years in Italy. He soon, however, rejoined Scipio, followed him in his African campaign, and was present at the destruction of Carthage 146. But the outbreak of war between the Achæans and Romans summoned him again to Greece, where he arrived soon after the taking of Corinth. All his influence was exerted to procure from the conquerors favorable terms for the vanquished; and so grateful were his countrymen for his services in their behalf, that they erected statues in his honor at Megalopolis (his native town), Mantinea, Pallantium, Tegea, and other places. It must have been about this time that P. undertook the writing of his great historical work, the materials of which he had long been collecting. It is not known at what period of his life he visited in foreign countries the places which he had to describe in his history. We know from himself that he undertook long and laborious journeys into Africa, Spain, Gaul, and even as far as the shores of the Atlantic, to add to the scanty knowledge regarding these regions. These journeys were probably while accompanying Scipio. In the latter period of his life, he travelled in Egypt; and about 12 years before his death he probably accompanied Scipio to Spain, where he witnessed the fall of Numantia. He died in his 82d year, in consequence of a fall from his horse.

As a historian, P. occupies high rank. His work, beginning where that of Aratus breaks off, includes the period B.C. 220–146, i.e., to the year when Corinth fell, and, with it, the independence of Greece. Of the two parts into which it was divided, the first embraced 53 years, beginning with the second Punic war and the social war in Greece, and ending with the subjugation of the kingdom of Macedonia 168. This, the chief portion of his history, was designed to show how, in the short space of 53 years, the greater part of the world had been conquered by the Romans; and in order that his countrymen might have better knowledge of the rise of that people, he gives a sketch of the history of Rome from its capture by the Gauls to the outbreak of the second Punic war. This occupies the first two books, and may be regarded as an introduction to the work. The second part embraces the period from the fall of the Macedonian kingdom, 168, to the taking of Corinth 146. This part is supplementary to the first, and seems to have brought down the history of the conquest of Greece to its completion in the 39th book, while the 40th and last probably contained a chronological summary of the entire work. The style of P is not to be praised, and he incurred the censure of later Greek critics for negligence in choice of words and in structure of sentences. His tone is too didactic in general; he abounds in moral reflections and loses no opportunity for preaching; and though his readers are prepared for this by his calling his work not a *Historia*, but a *Pragmateia*, still the continuity of the narrative is too often interrupted by digressions, often of little interest or value, and at best fatal to unity of impression and artistic effect. His praiseworthy aim at thoroughness and comprehensiveness, and to show the entire political situation at each important occasion, leads to wearisome and confusing digressions. His great merits are the conscientious care with which he collected his materials, his critical insight and breadth of view, his strong love of truth, and his sound judgment, which was materially assisted by his familiarity with political and military life. Much the greater part of his work has perished. Of the 40 books, we possess only five entire; and of the rest, merely fragments or extracts. Some of these latter, however—such as the account of the Roman army—are of considerable length and value, and four separate collections of them have been added from time to time to the remains of the work. The first of these, discovered soon after the revival of learning, in a MS. of Corfu, gives us the greater part of the 6th book, and portions of the remaining 11. The second consists of extracts made in the 10th c., entitled *Excerpta de Legationibus,* and published at Antwerp by Ursinus 1582. The third, *Excerpta de Virtutibus et Vitiis,* was published by

Valesius 1634. The fourth, *Excerpta de Sententiis*, was discovered by Cardinal Mai in the Vatican, and published by him, Rome 1827. The history of P. was very closely followed by Livy after the period of the second Punic war, and by Cicero in his account of the Roman constitution in his treatise *De Republicâ.*—The best annotated edition of P. is Schweighäuser's (Leip. 1789). The best editions of the text, including that of the Vatican fragments, are those of Bekker (Berl. 1844) and L. Dindorf (1866).

POLYCARP, *pŏl′ĭ-kârp·* bishop of Smyrna, and one of the most illustrious of the early Christian martyrs; b. sometime before A.D. 69; d. prob. 155, Feb 23. (The date of death has until recently been assigned to 166, in accordance with the *Chronicle* of Eusebius.) The place of his birth is not known. He was, however (according to a legendary fragment ascribed to an unknown Pionius), brought up at Smyrna, where his pupil, Irenæus, states that P. was taught the doctrines of Christianity by the apostles, particularly by John, with whom he had 'familiar intercourse.' The testimony of Irenæus on this point is of immense value, as it furnishes the chief historical link uniting the apostolic age—that age which is reflected in the later parts of the New Testament—with the rising church of the 2d c. The passage occurs in an expostulatory epistle to a Roman heretic, Florinus, and is preserved by Eusebius (*Hist. Eccl.* xx.). 'I can tell also the very place where the blessed Polycarp was accustomed to sit and discourse; and also his entrances, his walks, the complexion of his life, and the form of his body, and his conversations with the people, and his familiar intercourse with John, as he was accustomed to tell, as also his familiarity with those that had seen the Lord. Also concerning his miracles, his doctrine, all these were told by Polycarp, in consistency with the Holy Scriptures, as he had received them from the eye-witnesses of the doctrine of salvation.' The fragment of Pionius (above referred to) informs us that P., when a little child, was adopted by a rich Christian lady, Callisto, who left him heir to all her wealth, enabling him to gratify his love of beneficence and charity. We are utterly without means of verifying this narrative of Pionius; it is certain only that in some way P. had distinguished himself at a comparatively early period, for before the death of the apostle John (i.e., at the latest, before 104), P. was ordained bishop of the church at Smyrna (according to Tertullian and Jerome) by John himself; according to Irenæus, by 'the apostles;' and according to Pionius, by 'the bishops of the neighboring churches'—statements quite reconcilable with each other. P. was in the exercise of his pastoral office when Ignatius (q.v.) of Antioch passed through Smyrna on his road to Rome (107–116); and we are told that these two pupils of the apostle John, who had probably known one another in earlier years, had much delightful Christian converse. Almost half a c. afterward, P. himself visited Rome, when Anicetus was bp. there (157–168), and had a friendly conference with his brother on the subject of the proper time to hold

Easter. They could not agree—but they agreed to differ. His martyrdom, which is related at great length and in a touching manner by Eusebius (*Hist. Eccl.* xiv.), took place during the persecution under Emperors Marcus Aurelius and Lucius Verus. When asked, or rather entreated, 'to revile Christ' by the proconsul Statius Quadratus, who, being deeply impressed with the venerable appearance of the aged bishop, wished if possible to save his life, P. replied: 'Eighty-and-six years have I served Him, and He never did me wrong; and how can I now blaspheme my King that has saved me?' P. was burned alive. In such profound reverence was he held by his fellow-Christians, for his almost perfect graces of character, that the Jews (who had been conspicuously zealous in collecting 'wood and straw from the shops and baths' to burn him) instigated the proconsul not to give up the corpse of the martyr to his co-religionists, 'lest, abandoning him that was crucified, they should begin to worship this one.' More convincing evidence of a saintly character has never been adduced.

P. wrote several *Epistolæ*, of which only one has been preserved, *Epistola ad Philippenses*, valuable for its numerous quotations from the New Test.—especially from the writings of Paul and Peter. There has been some doubt whether this epistle is really by P.; but this doubt is lessening. In the most recent edition of the Apostolic Fathers (*Patrum Apostolicorum Opera*, Leipzig 1877), Prof. Zahn defends its genuineness. There are English versions by Cave, Clementson, and Wake.

POLYCARPOUS, a. *pŏl'ĭ-kâr'pŭs*, or Pol'ycar'pic, a. *-pĭk* [Gr. *polus*, many; *karpos*, fruit]: in *bot.*, having the carpels distinct and numerous, each flower bearing several fruits—applied to plants which flower and fruit many times in the course of their life.

POLYCEPHALOUS, a. *pŏl'ĭ-sĕf'ă-lŭs* [Gr. *polus*, many; *keph'ălē*, the head]: in *bot.*, having a common support, capped by many like parts.

POLYCHORD, n. *pŏl'ĭ-kawrd* [Gr. *polus*, many; *chordē*, a string or chord]: an instrument having many strings; an apparatus which couples two octave notes.

POLYCHROITE, n. *pŏl'ĭ-krō'ĭt* [Gr. *poluchrŏos*, variegated—from *polus*, many; *chrŏa*, color]: the coloring matter of saffron, which exhibits a variety of colors when acted upon by various reagents.

POLYCHROME, n. *pŏl'ĭ-krōm* [Gr. *polus*, many; *chrōma*, color]: a peculiar substance obtained from the bark of the horse-chestnut, and in quassia-wood, which gives to water the quality of exhibiting a curious play of colors when acted upon by reflected light: Adj. executed in the manner of polychromy. Polychromatic, a. *pŏl'ĭ-krō-măt'ĭk*, yielding many colors; exhibiting a play of colors—applied to an acid resulting from the action of nitric acid upon aloes. Pol'ychromy, n. *-mĭ*, the art of coloring statuary to imitate nature; the art of heightening the effect of architectural decorations by the application of colors.

POLYCHROME PRINT′ING, *pŏl′i-krōm:* art of printing in one or more colors at the same time; a process successful with metal plates first in the hands of Congreve, England 1820. Sir William Congreve had seen Applegath's polychromatic block-printing press, by which very rude colored pictures were produced, and he conceived the idea of improving on the press, and doing the work with metal. His plan is extremely simple, though requiring great nicety in operation. First, the picture is outlined upon a metal-plate; and supposing it intended to have two colors, then the details of only the chief color are completed upon it, and all the parts for the other color are cut out; and into those parts other plates are fitted, like the portions of a child's puzzle-map, but with very great exactness; and upon these the engraving for the parts of the second color is completed. When these are done, a thickness of type-metal is attached to the back of these interior pieces, so that they can be held separately, and pushed forward or drawn backward at pleasure. Then they are so adjusted to the machinery of the press, that they are withdrawn when the first color-roller passes over the surface of the main plate, and are pushed forward beyond the face of the main plate, so as to receive the color of the second roller, which then passes over them without touching the first or main plate. Having received their colored ink, the secondary plates are again moved back to a perfect level with the other, so as to form an entire plate, carrying two colors, which are thus, in the ordinary way, imprinted on the paper. Since Sir William Congreve's patent, very many improvements have been made, the principle, however, remaining the same, and it now has very wide application.

POLYCLETUS, *pŏl-ĭ-klē′tŭs:* Greek sculptor: b. at Sicyon; contemporary with Phidias (B. C. 5th c.); called sometimes P. the Elder. He practiced his art chiefly at Argos. His most famous work was the *Hera* at Argos, carved in ivory and gold, deemed by ancient critics inferior in grandeur to Phidias's Zeus at Olympia, but surpassing it in finish. P. was unexcelled in rendering ideal forms of athletes. Of this class were his *Diadumenos* (an athlete putting round his own head the *diadema*, or crown of a victor in the games), and *Doryphoros* (lance-bearer). Another notable work of P. was his *Astragalizontes*, group of boys playing with knuckle-bones (*Astragala*). The originals of his works all have perished, but copies in marble of the head of the *Hera* (3 copies) and of the *Diadumenos* are extant.—P. the younger, also a sculptor, native of Argos, lived B.C. 4th c. His works also were mostly, but not exclusively, in bronze, and represented Olympian athletes: none have come down to our time.

POLYCOTYLEDON, n. *pŏl′ĭ-kŏt-ĭ lē′dŏn* [Gr. *polus*, many; *kotulē dōn*, a hollow vessel—from *kotulē*, a cup]: in *bot.*, a plant of which the embryos have more than two seed-leaves or cotyledons. **POL′YCOTYLE′DONOUS**, a. *-lē′dŏ-nŭs*, term applied to plants having more than two lobes to the seed: see COTYLEDON: DICOTYLEDONOUS. In some of the *Coniferæ* in particular, there are numerous cotyledons; the genus *Pinus* has from 3 to 12. These cotyledons are placed in a whorl, and have the gemmule of the embryo in the midst of them. Polycotyledonous plants do not form a separate division of the vegetable kingdom, but are ranked with dicotyledonous plants; for plants with two, and plants with more cotyledons, are found not only in the same nat. order, but in the same genus. **POL′YCOTYLE′DONY**, n. *-nĭ*, an accidental increase in the number of cotyledons.

POLYCRACY, n. *pŏ-lĭk′ră-sĭ* [Gr. *polus*, many; *kratos*, power, strength]: government by many rulers.

POLYCRATES, *pō-lĭk′ra-tēz:* famous Greek 'tyrant' of Samos: son of Æaces; b. in the first part of B.C. 6th c.; but nothing is known of him until the time when, with the assistance of his brothers Pantagnotus and Syloson, he obtained possession of the island B.C. 537 or 536. The three brothers at first ruled conjointly; but after a short time, P. put Pantagnotus to death, banished Syloson, and made himself sole despot. His energetic, unscrupulous, and ambitious character then showed itself more conspicuously. He conquered several islands of the Archipelago, and even some towns on the Asiatic mainland, waged war successfully against the inhabitants of Miletus, and defeated their allies, the Lesbians, in a great sea-fight. His fleet amounted to 100 ships, and was probably at that time the most powerful in all Greece. P. seems to have aspired to the sovereignty of the Ægean, if not also of the cities of Ionia. His intimate alliance with Amasis, King of Egypt, proves the importance in which this daring island-prince was held even by great monarchs. According to Herodotus, Amasis drew off from his alliance through alarm at the uninterrupted good fortune of Polycrates. He dreaded, we are told, the misfortunes that the envious gods must be preparing for so lucky a mortal, and to which his friends also would be exposed. The particular incident that is said to have finally ruptured the alliance is doubtless mythical, but is too well known to be overlooked. Amasis is reported to have written a letter to P., earnestly advising him to throw away the possession that he deemed most valuable, and thereby avert the stroke of the spleenful gods. P., in compliance with this friendly advice, cast an emerald signet-ring of marvellously beautiful workmanship into the sea; but next day a fisherman presented the 'tyrant' with an unusually big fish that he had caught, and in its belly was found the identical ring. It was quite clear to Amasis now that P. was a doomed man, and he immediately broke off the alliance. So, at least, Herodotus tells the story, but Grote (*History of Greece*. IV. 323) suggests—and the suggestion is far more probable—that P., with characteristic perfidy, abandoned the Egyptian for a Persian alliance, when he found the latter likely to be of more value to him in his ambitious designs. When Cambyses invaded Egypt B.C. 525, P. sent him a contingent of 40 ships, in which he placed all the Samians disaffected toward his 'tyranny,' and told the Persian king privately not to let them come back. However, they escaped in some way or other the fate which P. had designed for them, returned to Samos, and made war against the 'tyrant,' but without success. Hereupon, they went to Sparta, and succeeded in enlisting the sympathies, or, at any rate, in securing the help of both the Spartans and Corinthians. A triple force of Samians, Spartans, and Corinthians embarked for Samos, and attacked the city. After vainly besieging it 40 days, they sailed away, and P. became more powerful than ever; but Nemesis had her victim after all. A certain Orœtes, the Persian satrap of Sardis, had, for unknown reasons, conceived a deadly hatred against P., and having enticed the latter to visit him, by appealing to his cupidity, he seized and crucified him. Thus perished one of the most famous *thalassokrats*, or sea-kings, of Greek antiquity. He was a patron of literature and the fine arts, and had many poets and artists about his court. His intimacy with Anacreon, in particular, is celebrated, and in his praise that joyous bard wrote many songs. To P. also, in all probability, belongs the construction, or at least the enlargement, of those great buildings which Herodotus saw at Samos.

POLYCYSTINA, n. plu. *pŏl'ĭ sĭs'tĭn-ă*, or POLYCYSTINES, n. plu. *pŏl'ĭ-sĭs'tĭnz* [Gr. *polus*, many; *kustis*, the bladder]: an order of the Protozoa having foraminated siliceous shells. POLYCYSTIC, a. *pŏl'ĭ-sĭs'tĭk*, having many cells or small cavities; multilocular.

POLYDIPSIA, n. *pŏl'ĭ-dĭp'sĭ-ă* [Gr. *polus*, many; *dipsa*, thirst]: medical term for excessive thirst: now commonly applied to the disease formerly known as *Diabetes insipidus*, characterized by extreme thirst and by an enormous discharge of pale watery urine. The affection is rare, and the persons most liable to it are dyspeptics who have passed middle life, and whose bodily powers are failing, though it may begin in childhood. The two prominent features of this disease usually lead to the suspicion that true diabetes is present; but the low specific gravity of the urine, and the absence of sugar in it in polydipsia, and the reverse condition in diabetes, seem to make the distinction easy. Dr. Willis, in his work *On Urinary Diseases*, records the case of a man, aged 45, who was admitted for an accident into the Hôtel-Dieu at Paris, and who passed, daily, on an average, 34 lbs. of urine, and drank 33 lbs. of water, the normal daily excretion of urine being a little less than 2 lbs. This person reported that he had been affected in a similar manner ever since his fifth year, and that, from the age of 16, he had daily consumed not less than two bucketfuls of water, and discharged a commensurate quantity of urine. Little can be done for this disease by treatment, further than stimulating the action of the skin by the use of Dover's powder, Turkish baths, etc., and by inducing the patient to take as little drink as may be consistent with his comfort.

POLYEMBRYONY, n. *pŏl′ĭ-ĕm-brĭ′ō-nĭ* [Gr. *polus*, many; *em′bruon*, an embryo]: in *bot.*, the existence or development of two or more embryos in the same seed. Pol′yembryon′ic, a. *-brĭ-ŏn′ĭk*, having more than one embryo.

POLYFOIL, n. *pŏl′ĭ-foyl* [Gr. *polus*, many, and Eng. *foil*]: in *arch.*, an ornament formed by a molding disposed in a number of segments of circles.

POLYGALA, n. *pŏl-ĭg′ă-lă* [Gr. *polus*, much; *găla*, milk]: extensive genus of plants, all the species of which are showy; type of the order Polygaleæ (q.v.). P. Senega, *sĕn′ĕ-gă* [of or from *Senegal*]: the senega or snake root (see Senega). Polygalic acid, *pŏl-ĭg′ă-lĭk*, an acrid principle obtained from it.

POLYGALEÆ, *pŏl-ĭ-gā′lē-ē*, or Polygalaceæ, *pŏl-ĭ-gā-lā′sē-ē:* natural order of exogenous plants, herbaceous or shrubby, sometimes twining; the leaves without stipules, and generally simple; the flowers resembling papilionaceous flowers, but the odd petal inferior, and the odd sepal superior; the flower-stalks with three bracts; the calyx of five very irregular sepals; of which the two interior are usually petal-like; the corolla of three or sometimes five petals, the anterior petal the largest, and often crested; stamens eight, monadelphous or diadelphous, or four and distinct; the ovary superior, generally 2-celled, one ovule in each cell; style and stigma simple; fruit generally a capsule opening by valves, sometimes a drupe. There are about 500 species, diffused through all parts of the world.—The genus *Polygala* has a persistent calyx, eight stamens, the lateral sepals large and petal-like, and hairy or wrinkled seeds. The species are very numerous, annual and perennial herbaceous plants, and small shrubs, natives chiefly of warm and temperate climates. There are 15 or more species in the United States, several with yellow flowers (s. species), the rest purple, white, or greenish; the best known are the Seneca Snake Root, and the so-called Flowering Wintergreen (*P. paucifolia*), better named the Fringed P. The Common Milkwort of Britain (*P. vulgaris*) is a small perennial plant, growing in dry hilly pastures; with an ascending stem, linear-lanceolate leaves, and a terminal raceme of small but very beautiful flowers, having a finely crested keel. It varies considerably in size, in the size and even shape of the leaves, and in the size and color of the flowers, which are sometimes of a most brilliant blue, sometimes purple, pink, or white.—Several species are natives of s. Europe.—The Cape of Good Hope and other sub-tropical countries produce many beautiful species, some of which have become common ornaments of greenhouses.—*P. Senega* is a N. American species, with erect simple tufted stems, about 12 inches high, and terminal racemes of small white flowers. The root woody, branched, contorted, and about half an inch in diameter, is the Senega Root, Seneka Root, or Snake Root of the United States (see Senega), famous as an imaginary cure for snake-bites, but really possessing important medicinal virtues—stimulating, diuretic, diaphoretic, emmenagogue, and in large doses emetic and purgatives—employed in catarrhs, pulmonary affections, rheumatisms, low fevers, etc. Its chief active principle is Polygalin, Senegin, or Saponin, $C_{18}H_{24}O_{10}$. The root of *P. Senega* has been employed as a cure for snake-bites by the American Indians from time immemorial, and it is noticeable that *P. crotalarioides* is employed in the same way in the Himalaya. *P. vulgaris* is tonic, stimulant, and diaphoretic; and *P. amara* a very similar European species, possesses the same properties in a higher degree, as does *P. rubella*, a small N. American species. The root of *P. poaya*, a Brazilian species, with leathery leaves, is an active emetic, and in a fresh state is employed in bilious fevers. Similar properties seem to pervade the whole genus. Another medicinal plant of the order is *Rhatany* (q.v.) *root*. Species of several genera are used as tonics. The bark of the roots of *Monnina polystachia* and *M. salicifolia* is used in Peru as substitute for soap. *Mundia spinosa*, a S. African shrub, produces an eatable fruit.

Common Milkwort (*Polygala vulgaris*).

POLYGAMIAN, a. *pŏl'ĭ-gā'mĭ-ăn*, or POLYGAMOUS, a. *pŏl-ĭg'ă-mŭs* [Gr. *polus*, many; *gamos*, a marriage]: in *bot.*, pertaining to plants of the class POL'YGA'MIA, *-mĭ-ă*, which bear three descriptions of flowers—hermaphrodite, male, and female.

POLYGAMY, n. *pŏl-ĭg′ă-mĭ* [see Polygamian]: the practice or state of having several wives at the same time (see Marriage). Polyg′amous, a. *-mŭs*, having more than one wife at the same time; mating with several females; inclined to polygamy. In *botany*, term applied to plants which produce both unisexual and hermaphrodite flowers either on the same or different plants. In the Linnæan sexual system, these plants formed a class, Polygamia, the genera included in which were perhaps more completely disjoined from their natural allies than those of any other class of that system, forming by themselves a very heterogeneous assemblage. Polyg′amist, n. *-mĭst*, one who practices, or maintains the lawfulness of, polygamy.—See Bigamy: Mormons.

POLYGARCHY, n. *pŏl′ĭ-gâr′kĭ* [Gr. *polus*, many; *archē*, rule]: government by many; also Polyarchy.

POLYGASTRIC, a. *pŏl′ĭ-găs′trĭk* [Gr. *polus*, many; *gastēr*, the belly]: having many stomachs; applied to the minute and simple infusoria, formerly called Pol′ygas′trica (see Infusoria).

POLYGENISM, n. *pŏl-ĭj′ĕn-ĭzm*, or Polyg′eny, n. *-ĕn-ĭ* [Gr. *polus*, many; *genos*, kind, race]: the theory which teaches that God created man in different grades, both in savagery and civilization. Polyg′enist, n. *-ĕn-ĭst*, one who believes in the creation of man in different grades. Polygenous, a. *pŏl-ĭj′ĕn-ŭs*, consisting of many kinds.

POLYGLOT, a. *pŏl′ĭ-glŏt* [Gr. *polus*, many; *glōtta*, the tongue]: having or containing many languages: N. in general, an assemblage of versions in different languages of the same work; but used almost exclusively to denote a version of the Bible in several languages. The Hexapla (q.v.) of Origen contained, besides the Hebrew text, several other versions. All these, however, were in the Greek language; and the Hexapla is not commonly reckoned among the polyglots. The polyglots are divided into two classes, the greater and the less. To the former belong four works, known as the Complutensian P.; the Antwerp or king of Spain's P.; the Parisian P.; and the London or Walton's P.—The Complutensian P. derives its title from Complutum, Latin name of Alcala de Henares, where it was printed in 6 vols. folio, 1502–17, being published at the cost, and under the direction of the famous Cardinal Ximenes, who spared no expense, whether in collecting the most ancient and authentic MSS., or in bringing together the most distinguished scholars of all countries for carrying out his design. It contains, besides the Hebrew text, the Septuagint Greek and the Chaldee (each with a literal Latin version), and the Latin Vulgate.—The Antwerp P., so called from its being there printed (8 vols. folio, 1569–72), at the renowned press of Plantin, was published at the cost of Philip II. of Spain, under direction of the distinguished scholar, Benedict Arias Montanus; and contains, in the Old Test., the Hebrew, the Greek, the Targum of Onkelos, and the other Chaldee paraphrases, and the Latin Vulgate: in the New Test., besides the Greek and Latin, it contains a Syriac version, printed both in Syriac and in Hebrew characters. Arias Montanus was assisted by many scholars of eminence, chiefly of Spain and the Low Countries.—The Parisian Polyglot was printed in ten splendid vols. (Paris 1645) at the cost and under the editorship of Guy Michel le Jay; and contains, in addition to the contents of the Antwerp P., another Syriac version, and an Arabic version, together with the Samaritan version and the Samaritan text of the Pentateuch, each accompanied by a literal Latin translation.—The London P. (6 vols. folio, 1654–57) was edited by Brian Walton, afterward bp. of Chester, and it engaged for many years a number of the most eminent linguists of the period. The number of its languages is not the same in all parts of the Bible, but it may be said to contain the Bible, or portions of it, in 9 languages—Hebrew, Samaritan, Chaldee, Syriac, Arabic, Ethiopic, Persic, Greek (each of these accompanied by a literal Latin version), and Latin; and was followed 1669 by *Lexicon Heptaglotton* of Edmund Castell, 2 vols., folio, containing dictionaries of all the languages of the polyglot, except the Greek and Latin. Of the minor polyglots, the chief are (1) the Heidelberg P. (1586), Hebrew, Greek, and Latin; (2) Wolder's P. (Hamburg 1596), Hebrew, Greek, Latin, and German; (3) Hutter's P. (Nürnberg 1599), Hebrew, Chaldee, Greek, Latin, German, and French; (4) Reineccius's P. in Syriac, Greek, Latin, and German (Leipzig, New Test. 1712, Old Test. 1750–1); (5) Bagster's P., very valuable collection of modern versions, folio (London 1831), containing eight versions, in the Old Test.—viz., Hebrew, Greek, English, Latin, French, Italian, Spanish, and German; and nine in the New Syriac being added to the foregoing; (6) a useful 'Hand P.,' containing in the Old Test., Hebrew, Greek, Latin, Vulgate, and Luther's German version; and in the New Test., Greek, Latin, Luther's German, and in the fourth column presenting the chief differences between this and other German versions.

Besides the Bible, many other works, or small pieces, have been published in P. Of smaller pieces, the Lord's Prayer has been the favorite, of which many collections, containing a greater or less number of languages, have been published since the 16th c. Of these, the most comprehensive, and, for philological purposes, far the most valuable, is the well-known *Mithridates* of Adelung, which contains the Lord's Prayer in nearly 500 languages, with vocabularies and grammatical explanations of most of the specimens.

POLYGNOTUS, *pŏl-ĭg-nō'tŭs:* distinguished Greek painter of antiquity; born in the Isle of Thasos, near the beginning of B.C. 5 c; d. about B.C. 426; of a family of painters, who came to Athens to practice their profession probably after the subjugation of Thasos by Cimon. P. and his brother, Aristophon, were instructed in the principles of art by their father Aglaophon. We know almost nothing of their lives, except that P. was a friend of the Athenian general Cimon, and is said to have been attached to his sister, Elpinice. P. was a contemporary of the great sculptor Phidias (q.v.), and flourished during the supremacy both of Cimon and of Pericles; but we hear little or nothing of him under the latter ruler; and though he was the first painter of his day, it does not appear that he was engaged in the decoration of any of those splendid buildings with which that statesman adorned Athens. It is not at all unlikely that Pericles was averse to patronizing a friend of Cimon, and, at all events, P. was absent from Athens 14 years (B.C. 449–435) of Pericles's rule, painting at Delphi and elsewhere. His principal works (following a chronological arrangement as far as it can be ascertained) were: 1. Paintings in the Temple of Theseus at Athens. 2. In the Stoa Poecile (or Painted Portico) at Athens, representing the Greek princes after the taking of Troy, assembled to judge of the violation of Cassandra by Ajax. 3. In the Anakeion, or Temple of the Dioscuri, a painting of the marriage of the daughters of Leukippos. 4. In the Temple of Athena Areia at Platæa, a picture of Ulysses after having slain the suitors of Penelope. 5. In the Leschê (or 'Conversazione Saloon'), a famous quadrangular court, or peristyle, surrounded by colonnades, built at Delphi by the Cnidians. The walls of this edifice were covered by P. with a series of paintings representing the wars of Troy, and the return of the Greek chiefs, and considered P.'s masterpiece. 6. In the chamber adjoining the Propylæa of the Acropolis. From the criticism of the ancients, it appears that P. was a great advance on any of his predecessors in the art. He was the first who gave life, character, expression to painting. According to Pliny, he opened the mouth and showed the teeth of his figures; he was the first to paint women with transparent drapery, and with rich head-dresses. Lucian also speaks of his exquisite skill in painting eyebrows and the blush on the cheek; while Aristotle extols the ethical or ideal beauty of his conceptions, saying that P. 'represented men as better than they were,' and finding a parallel for his style in the epic poetry of Homer.

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